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29 July 1982



# USSR Report

AGRICULTURE

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MAJOR CROP PROGRESS AND WEATHER REPORTING

GRAIN CROP SOWING OPERATIONS IN SEMIPALATINSKAYA OBLAST

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 13 May 82 p 1

Article by L. Reznikov, Semipalatinskaya Oblast: "In Order To Obtain Good Ears"

Text The unstable weather has caused considerable problems for the farmers in the Semipalatinsk region. Warm sunny days have frequently been replaced by cold snaps accompanied by falling snow and strong winds. Under such conditions, it was necessary to maneuver the equipment and make maximum use of the good weather periods. The agricultural workers are striving to carry out their entire complex of spring field operations as rapidly as possible and to establish a strong foundation for the future harvest.

On the day of our arrival at the field camp of the Fourth Department of the Sovkhoz imeni Budennyy, a celebration was in progress for those grain growers who were the first on the farm to complete their sowing of grain crops. In all, eight days were required in order to plant the seed on an area in excess of 6,000 hectares. This was the result of the increasing technical equipment level of the sovkhoz and of improvements with regard to the availability of machine operator personnel. All of the units are being operated in two shifts. Mobile technical services teams operate directly out on the fields.

One of the leaders of the competition for organized carrying out of the sowing work is S. Zhalelov. For more than 10 years now, he has cultivated grain, operated a K-700 tractor during sowing operations and when procuring feed and when the harvest period arrives -- he operates a combine. This year he was assigned a relief machine operator, a novice by the name of K. Urazbayev who only recently completed a training course. The merging of experience and youth produced worthwhile results. Each day this crew sowed grain crops on 70-75 hectares -- almost twice as great as the norm.

The Sovkhoz imeni Budennyy is the largest in Kokpektinskiy Rayon. Its grain fields exceed 20,000 hectares. The farmers have accomplished a great deal towards raising the cropping power of their fields. During the winter snow retention work was carried out, moisture was worked into the soil and an adequate amount of organic fertilizer was moved out onto the fields. All of the seed meets the requirements for 1st and 2d class. Notwithstanding the fact that the farm's soil is poor, the grain growers resolved to obtain in excess of 9 quintals of grain from each hectare. This will make it possible for them to fulfill their obligation for selling grain to the state in an honorable manner.

The grain growers on other farms in the rayon are also displaying concern regarding the generosity of the ears. They have converted over completely to non-mouldboard plowing of the soil using anti-erosion implements. Many cultivator-sweeps were received this year; they are used for simultaneously tilling the fields and applying mineral fertilizers. The goal of the grain growers in Kokpektinskiy Rayon is high -- to provide the granaries of the homeland with 70,000 tons of grain.

The sowing work has already been completed in the southern part of the oblast. And it is nearing completion in the central rayons. Meanwhile, it is just commencing in the northern part of the oblast. Thus, special importance is being attached to ensuring that all blunders committed during the course of spring operations are fully taken into account. This year the greatest workload will be borne by the powerful K-700 and k-701 tractors. During the past few years, the pool of these machines has grown and now numbers 2,000. But are they all in the field at the present time? Apparently not. One hundred and twenty of these tractors, required for the rapid completion of all work, are lying idle. More often than not, the reason is the same -- defective engines. Their restoration has been entrusted to the Atbasar Repair-Mechanical Plant. The machine operators are often heard criticizing the work of this plant. Engines which have undergone repair work do not last for the indicated service life, but rather break down rather quickly.

Attempts are being made throughout the oblast to find a solution for this problem. At a new technical service station for motor vehicles which is subordinate to the oblast association of Goskomsel'khoztekhnika, a sector has been set aside for the repair of tractor engines. However, its productivity is as yet very low -- at the most, 2 units per month.

The exchange points created at all rayon associations of the above-mentioned department are not fully serving their intended purpose. For all practical purposes, it is not possible here to obtain ready engines in exchange for those turned over for repair work. The time has come to achieve solutions for these problems and to realize more efficient use of the equipment.

Strain renovation work must also be carried out. In addition to the traditional varieties of Saratovskaya-29 wheat and Donetskiy-650 barley, a path must be forged out on the fields for such new varieties as Tselinnaya-21 and Nakat wheat and also Donetskiy-8 barley, all of which furnish high yields under dry summer conditions. This year the plans call for the regionalization of two promising varieties -- Orenburgskaya-2 and Zhigulevskaya wheat. Unfortunately, a number of farms are still using the obsolete Eritrospermum-841 variety in their crop rotation plans. This variety was long ago replaced by the more productive Kazakhstanskaya-4 variety, bred by the plant breeders of Alma-Ata.

The oblast's grain fields occupy more than 1 million hectares. Grain crops have already been planted on one half of this area. In 1982 the agricultural workers must raise the gross yield of grain to 1 million tons and sell 480,000 tons to the state. Approximately 500 mechanized detachments and teams undertook to fulfill the established tasks. The party, soviet and agricultural organs are under an obligation to assist the farmers in carrying out all of their field work in an efficient and organized manner and in obtaining high yields.

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## MAJOR CROP PROGRESS AND WEATHER REPORTING

### WEATHER, SOWING, EQUIPMENT CONDITIONS IN SEVERO-KAZAKHSTANSKAYA OBLAST

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 15 May 81 p 1

Article by A. Raysh, Severo-Kazakhstanskaya Oblast: "True To One's Word"

Text Spring, which arrived 10 days earlier than usual in northern Kazakhstan this earlier, turned out to be unusually warm, rapid and steady. This intensive warm spell caused corrections to be introduced into the sowing strategy and tactics. Favorable weather conditions were created for the germination of weeds and their timely destruction and the farmers took advantage of this fact. On the farms the seed is being planted in soil that has been well cleansed of weeds.

Recognizing their high responsibility as initiators of the republic's socialist competition for the timely and high quality carrying out of the spring field operations, the oblast's grain growers accomplished a great deal of work prior to the commencement of such work. In the autumn, plowing was carried out on almost all of the spring crop fields. Repeated snow retention work was carried out on 2,386 hectares. The machine operators displayed concern for raising the fertility of the land. Considerably more organic fertilizer was applied to the arable land than has been the case in past years. The seed for spring wheat, mainly the Saratovskaya-29 and Omskaya-9 varieties, meets the conditions for 1st and 2d class. All of the available equipment: tractors, soil cultivating and sowing machines were made ready for the designated period. The field camps were equipped and they became a second home for the machine operators.

The collective of the brigade headed by Hero of Socialist Labor Leonid Yakovlevich Beloglazov is presently performing efficient work out on the fields of the Nikolayevskiy Sovkhoz in Leninskiy Rayon. The sowing work is being conducted along a broad front. The equipment is being operated without interruption. This year the brigade intends to surpass the 20 quintal goal which it achieved during the Tenth Five-Year Plan. Its experience is being utilized on other farms throughout the rayon.

The sovkhozes and kolkhozes in Bulayevskiy, Sergeyevskiy, Vozvyshenskiy and other rayons are sowing their wheat in an organized manner.

We have just visited the fields of many sovkhozes and kolkhozes. An efficient work rhythm is evident in all areas. Mechanized complexes have been created on the farms, each of which operates on the basis of sowing work plans prepared in advance. The machine operators are organizing the work in a manner such that no pause will

ensue between operations. The topping off of the tractors with fuel and the sowing machines with seed has been mechanized in all areas. Workshops on wheels are servicing the units directly out on the fields. When a breakdown occurs, it is rectified immediately.

The farm party committees are displaying a great amount of concern for ensuring that the teams in the sowing production line perform efficiently and harmoniously. Strict control has been organized over the quality of the sowing work, the correct use of fertilizers and the thrifty expenditure of fuel.

All of the spring field work in the oblast is being carried out using internal resources. This year, 6,000 additional machine operators will undertake training courses on the farms and at professional-technical schools.

Nevertheless, despite a high level of labor organization, serious derelictions are still being observed in connection with preparations for the sowing work. Not all of the equipment has been included in the operations. Approximately 400 K-700 tractors are lying idle throughout the oblast. This powerful equipment is lying inactive owing to a lack of spare parts -- transmissions, rear axles, piston groups and other units. The oblast association of Goskomsel'khoztekhnika has not displayed concern for ensuring that the farms and their repair enterprises are supplied with the necessary spare parts in a timely manner. And as a result, the entire tractor pool is not being included in the work. In accordance with the decree of the CC CPSU and the USSR Council of Ministers entitled "Additional Measures for Ensuring the Harvesting of the Crops and the Procurements of Agricultural Products During 1982 and the Successful Wintering of the Livestock During the 1982-1983 Period," importance is being attached at the present time to ensuring that no abatement takes place in the sowing rhythm.

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## MAJOR CROP PROGRESS AND WEATHER REPORTING

### RESERVES FOR INCREASED POTATO PRODUCTION IN GEORGIAN SSR

Tbilisi ZARYA VOSTOKA in Russian 16 May 82 p 2

Article by G. Giorgadze, chief of Administration for Vegetable and Melon Crops and Potatoes of Georgian SSR Ministry of Agriculture: "Generosity of the Potato Fields; for related material, see also JPRS 81094/1333, 21 June 1982, No. 302 of this series, pp 11-12 and 28-29/

Text During the 26th party congress and the November (1981) Plenum of the CC CPSU, Comrade L.I. Brezhnev referred to the food program as a priority task, one which from both an economic and political standpoint is to be viewed as a central problem of the entire five-year plan. The satisfaction of the population's requirements for food products is a strategic task of the entire agroindustrial complex, with an important sub-complex being that of potato production.

There is good reason for the people referring to potatoes as the "second grain." A great amount of attention is being given to potato production in our republic. During the years of the Tenth Five-Year Plan alone, we procured twice as many potatoes as during the Ninth Five-Year Plan. The cropping power of the potato fields increased by almost 30 percent. And certainly mention should be made first of all of the success achieved by the workers in Marneul'skiy and Bolnisskiy Rayons. It was mainly owing to their efforts that the republic, during the years of the Tenth Five-Year Plan, firmly assumed a leading position in the production of early potatoes and became one of the best suppliers of potatoes to the all-union fund.

The republic's potato growers have successfully completed the first year of the Eleventh Five-Year Plan. Overall, they sold 174,000 tons of tubers to the state against a plan calling for 172,000 tons. Ninety one thousand tons of early potatoes were procured and 50,100 tons shipped to the all-union fund against a plan calling for 89,000 and 47,800 tons respectively.

At first glance it might seem that the considerable growth achieved in our republic in the production and procurements of potatoes testifies to a certain well-being in the management of the branch. But a more thorough analysis reveals that we are not justified in remaining satisfied with that already achieved. For example, our average cropping power for potatoes is considerably lower than the all-union indicator. And the average per capita consumption of potatoes in the republic is lower than the same figure for the country.

Such a situation is mainly explained by the fact that a majority of the republic's kolkhozes and sovkhozes are annually failing to fulfill their plans for potato production. Last year, for example, the task for the production of tubers on the republic's public farms was underfulfilled by 30,000 tons. Only four of 21 rayons succeeded in handling this task. In Akhaltsikhskiy Rayon, for example, the plan for cropping power and potato production was fulfilled by only 54 percent, in Adigenskiy Rayon -- 46, Aspindzskiy -- 25, Borzhomskiy -- 17, Onskiy Rayon -- 16 and in the rayons of the Yugo-Osetinskaya AO -- 15 percent. Moreover, the farms in Borzhomskiy and Onskiy Rayons and in the Yugo-Osetinskaya AO consumed more potatoes for seed purposes than they actually harvested.

Moreover, it was mentioned quite fairly during the 4th Plenum of the Central Committee of the Communist Party of Georgia that the kolkhozes and sovkhozes are making very poor use of the reserves that are available for raising the cropping power and quality of the potatoes. First of all, a number of kolkhozes and sovkhozes are clearly not observing in a strict manner the rules and norms for the cultivation of potatoes and they are not undertaking radical measures aimed at combating the agricultural pests and diseases. Quite often the rules for intra-farm seed production and strain renewal are being violated on the farms -- hence the quality of the seed material is low, use is not being made of the small quantities of organic fertilizers that are available and the organization of mechanical watering leaves much to be desired. A conservative attitude is being observed in all areas with regard to those problems concerned with the mechanization of harvest operations and the sorting, loading and shipping of tubers. Use is not being made of repeated digging up of the potatoes at the harvesting sites and this is resulting in great crop losses.

It is precisely for these reasons that the plans for potato production are for the most part not being fulfilled on such large farms as the Pamadzhskiy, Skhviliyskiy and Minadzevskiy Sovkhozes in Akhaltsikhskiy Rayon, at kolkhozes in the villages of Arali, Ude and Chorchani in Adigenskiy Rayon and at the Varkhanskiy Sovkhoz in Adigenskiy Rayon.

Sharp differences are being recorded in the results being obtained in such a leading potato production rayon as Akhalkalakskiy. At a kolkhoz in the village of Abul, for example, an average of 56 quintals of tubers was obtained from 1 hectare and at a neighboring kolkhoz in the village of Burnasheti -- 253.5 quintals. At the Karzakhskiy Livestock Sovkhoz the cropping power does not exceed 81 quintals and at another livestock production kolkhoz at Vachianskiy -- 170 quintals.

Experience has shown that a reduction in the sowing areas for potatoes in some rayons leads to a reduction in the cropping power for this crop. For example, such a phenomenon is being observed in rayons in the Yugo-Osetinskaya AO. Undoubtedly, a reduction in the areas leads to a weakening in specialization and to reduced interest in potato production. Thus we consider one reserve for raising the cropping power and increasing the production of potatoes in some rayons to be that of increasing the sowing areas and accordingly -- intensifying specialization in this very important food and forage crop.

There are also other factors which are adversely affecting an increase in the production of potatoes. For example, the regionalization of new and promising strains is being dragged out too long. During the past 10 years, only two new

varieties -- Ogonek and Belorusskiy Early -- have been regionalized in the republic. However, they have not proven their worth in the high mountainous zone, where late potatoes are produced for the most part.

In the high mountainous zone, the level of mechanization of potato cultivation and harvesting processes is the lowest and the respective republic scientific centers, I have in mind the Scientific Research Institute of Mechanization and Electrification and the Scientific Research Institute of Farming are not carrying out sufficient active work in this direction.

As yet, solutions have not been found for the problems of sorting and the proper procurement and shipping of potatoes to the consumers. The procurement organizations cannot organize the acceptance of potatoes out in the various areas and quite often the kolkhozes and sovkhozes supply the procurement specialists with low quality products. Moreover, a number of farms in Tsalkskiy, Akhaltsikhskiy, Dmanisskiy, Akhalkalakskiy and other rayons are literally ignoring the measures which are binding upon them with regard to radically improving the sorting process through the creation of specialized brigades and teams, installing sheds and platforms and equipping them with conveyer lines and other items of equipment.

At the present time, during the stage of tending the early potato plantings and sowing the late potatoes, the potato growers are confronted by a most important task: carrying out measures prepared for the purpose of further developing the branch. Included among them -- expanding irrigation, improving the structure of the land and introducing a progressive technology into the production operations. The construction of potato storehouses and supplying the farms with the necessary equipment, fertilizers and chemicals -- all of this will aid us in raising the production of potatoes to 350,000 tons annually by the end of the present five-year period. Once again I wish to emphasize: upon the condition that all of the reserves mentioned above are placed in operation.

Bogdanovskiy Rayon serves as an example of the results to be realized from the above. Here, as a result of implementing improvements in the agricultural practices over the past 2 years, the republic's highest yields of the "second grain" were obtained. Mention must necessarily be made of the initiative displayed by the workers in Tsalkskiy Rayon, who expanded their potato fields considerably following the development of new lands and the draining of swampy tracts. Peat is being employed here effectively as fertilizer, with the rayon having considerable deposits of peat. The workers in Akhalkalakskiy Rayon are displaying great interest in this work and conducting an active search for reserves for raising the cropping power of the potatoes.

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## MAJOR CROP PROGRESS AND WEATHER REPORTING

### BRYANSKAYA OBLAST POTATO PLANTING OPERATIONS

Moscow PRAVDA in Russian 20 Apr 82 p 1

Article by M. Atamanenko, Bryanskaya Oblast: "Harmonious Work"

Excerpt Klimovskiy Rayon is one of the oblast's "potato" rayons. This year the farmers here prepared for their field work in an efficient manner: they moved sufficient fertilizer out onto the fields, they laid away good seed and they carried out moisture retention work in a timely manner.

"The farms have commenced planting their early varieties" stated the 1st secretary of the rayon party committee L. Blindovskiy, "Much will depend upon the manner in which the work is organized and upon the mood of the personnel. The party committees and bureaus and all of the communists are displaying concern for ensuring that all elements in the sowing production line perform harmoniously and efficiently. They are devoting a maximum amount of attention to ensuring that the personnel are supplied with everything required for fruitful work and proper leisure. A socialist competition has been launched for raising no less than 185 quintals of potatoes on each hectare and lowering production costs per quintal of tubers from eight to six rubles."

Having borrowed the experience of leading workers and farms, the machine operators on many farms are skilfully maneuvering their equipment and introducing an industrial technology. The farmers at the Komsomolets Kolkhoz in Novozybkovskiy Rayon have converted the production of tubers over to an industrial basis almost completely. They have just commenced planting their early potatoes.

"More than 100 tons of organic materials have been applied to each hectare" stated the chairman of the kolkhoz P. Yefimenko, "The very best seed was selected."

The oblast's potato fields occupy an area of 116,000 hectares, with early ripening varieties being grown on a considerable portion of this area. The farmers commenced their preparations for the busy spring season in the autumn, immediately following the harvest operations. In September - December, the fertility detachments (there are approximately 500 of them) began making composts. Each hectare will be supplied with more than 50 tons. Strict control was established over the seed clamps, with the tubers being given good protection. Pre-planting sorting was begun on time and more than 400,000 tons have already been prepared. Roughly 30,000 tons have been placed under plastic, in barns and in storehouses for germination purposes.

For the very first time, the farms in Novozybkovskiy Rayon began carrying out ridging work using re-equipped cultivators, while simultaneously applying mineral fertilizers to the drill rows. At the same time, some farms are not making sufficient use of the potential embodied in their machines and they are dragging out their soil preparation and sowing schedules. And this can only result in crop losses.

Commencing with the very first days of the busy spring season, a competition was launched for carrying out the work during the best periods and in a high quality manner. The results are being summarized daily, flags of labor glory are being raised in honor of the leading workers and letters of thanks are being sent to their families. The party and professional trade union organizations are displaying concern for motivating the personnel to carry out their work at a higher tempo.

The potato growers in Bryanskaya Oblast, having undertaken high obligations in the competition to worthily prepare for the 60th anniversary of the USSR, have resolved this year to obtain a good harvest and to sell 715,000 tons of tubers to the state.

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## MAJOR CROP PROGRESS AND WEATHER REPORTING

### POTATO PLANTING OPERATIONS IN BASHKIRSKAYA ASSR

Moscow SEL'SKAYA ZHIZN' in Russian 26 May 82 p 1

Article by V. Orlov, Bashkirskaya ASSR: "In Keeping With the Best Example"

Excerpts The farmers in the Bashkirskaya ASSR are completing their potato planting work. The crop is grown here on rather large areas: every other farm grows marketable tubers. Thus increased attention is being given to the cultivation of potatoes in all areas.

On the whole, the potato planting work is being carried out at a high tempo. Moreover, a search is underway in Abzelilovskiy, Zianchurinskiy and Karmaskalinskiy Rayons for the means for expanding the areas. The bottlenecks in the technological chain, which until recently have held up the work, have been eliminated. Here we have in mind the unloading of the seed stock from the storehouses, the sorting work and the loading up of the planting machines along the edges of fields.

The results of the preparatory work, carried out prior to the commencement of the mass planting of potatoes, are visible everywhere. At one farm -- it is a conveyer line which transports the tubers from the storehouse to a site or to a motor vehicle hopper. At another -- it is the picking table, which helps 5-8 workers do the work of 20. And at a third farm -- it is a storage-hopper or written off self-propelled combine which loads the tubers into the planting machine. Each such device promotes an acceleration in the planting tempo and better use of the equipment.

The tone in this work is being set by those farms which commenced the specialization in the production of this valuable crop. In suburban Ufimskiy Rayon, the principal portion of the plantations is concentrated at the Shemyakskiy and Chapayevskiy Sovkhozes, at the Rodina and Druzhba Kolkhozes and at some others and this has brought about a considerable increase -- up to 4,000 hectares -- in the planting area. An improvement has taken place in the level of mechanized operations, more attention is being given to fertilizing the fields and the progressive methods for planting the tubers -- ridging and semi-ridgning -- are being employed on a more extensive scale.

The achievements are coming about as a result of harmonious actions between all of the auxiliary and principal elements of the sowing production line. The experience was summarized immediately and this enabled the farm to accelerate the

work almost immediately thereafter. On the whole, the farms in Ufimskiy Rayon are among the first in the republic to complete their potato planting work.

At the Kolkhoz imeni Salavat in Sterlitamakskiy Rayon, the planting was completed several days ago. But on the previous evening the units of Rinat Abdullin, Khalil Gimalov and Damir Ganeyev commenced their pre-seedling harrowing. Such is the requirement in the agricultural practices employed here and such was the prompting of the experts at obtaining high yields, based upon their own experience. On almost every field, the potato growers in the Bashkirskaya ASSR are following the experience of leading workers and farms.

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## MAJOR CROP PROGRESS AND WEATHER REPORTING

### BRIEFS

BEST PREDECESSOR CROP ARRANGEMENTS--Petropavlovsk--A grain field structure which ensures the growing of wheat following the best predecessor crop arrangements is being introduced into operations on farms throughout the oblast. It is known that fallow land is an "accumulator of fertility" and that it retains the productive strength of land for a second and third year. Wheat is also grown on fields from which corn has been removed. The growing of wheat throughout the oblast on more than 1 million hectares of fertile land has become possible owing to new crop rotation plans being employed by all of the oblast's farms -- four-plot fallow-grain and two-plot fodder-grain. The work is now being carried out by the sowing machine operators, who are expanding the front of work and achieving high quality operations. Text/ Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 16 May 82 p 1/ 7026

GRAIN PRODUCTION IMPROVEMENTS--Severo-Kazakhstanskaya Oblast--For several years now, the grain growers in Sergeyevskiy Rayon have been following a certain motto in carrying out their work. The campaign to raise the culture of grain production -- is a campaign aimed at increasing the productivity of the fields and increasing the yields of grain. Our rayon is one of the largest in the oblast with regard to the production of grain and other agricultural products. Our natural-climatic conditions are not of the best. The rayon's soil is saline and has a complicated chemical structure. The amount of precipitation is small. But despite these conditions the farms are still obtaining good yields. Last year, a dry one, 12.1 quintals of grain per hectare were obtained. Stable grain production was achieved owing to the development of a soil-protective system of farming. In the grain harvest campaign, use is being made of all possible reserves in the interest of obtaining a maximum yield under any and all conditions. In behalf of this year's sowing operations, the farms carried out their fall plowing in a timely manner and they also executed an entire complex of winter agricultural measures. More organic fertilizer has been applied to the fields than has been the case in past years. In the spring the moisture was plowed into the soil on a timely basis and the soil leveled off. The sowing work is being carried out at a high agrotechnical level. More than 2,000 grain growers, one out of every five of whom is a communist, are participating in the field work. The rayon's farms must sow approximately 160,000 hectares. The work tempo at the present time is considerably higher than that for last year. The grain crops have already been sown on more than one half of the planned areas. The sowing is being carried out using only anti-erosion sowing machines with mineral fertilizer being applied at the same time. The rayon's farmers recall an old saying: "Spring is beautified by flowers and autumn by sheafs of grain crops." They are doing everything possible

in the interest of achieving a maximum yield and worthily fulfilling the socialist obligations undertaken in honor of the 60th anniversary of the USSR and the 250th anniversary of the voluntary merging of Kazakhstan with Russia. And these are high obligations for the workers in Sergeyevskiy Rayon -- they must cultivate and obtain an average of 17 quintals of grain and supply the granaries of the homeland with no less than 8 million poods of grain. /by Ya. Gal'ster, chief of the Sergeyevskiy Rayon Agricultural Administration/ /Excerpts/ /Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 23 May 82 p 1/ 7026

WHEAT SOWINGS--Pavlodar--The farms in Yermakovskiy, Krasnokutskiy, Pavlodarskiy and Shcherbaktinskiy Rayons were the first to move their sowing units out onto the fields. Warm weather accelerated the sprouting of the weeds. Thus the arable land must be cultivated prior to planting the seed in the soil. The seed being sown is of 1st or 2d class quality. The oblast's farmers have set aside more than 1 million hectares for the growing of wheat -- more than originally planned. The moisture has been plowed into the soil on all of the arable land. Fertilizer will be applied to the drill rows on one fifth of the wheat fields. On a portion of the tracts, wheat is being grown as the second crop following fallow. Five hundred and 30 complexes and detachments and approximately 2,500 teams were formed for the purpose of ensuring the rapid and high quality planting of the seed. The conditions for the competition and the measures for issuing material and moral incentives have been developed. This year, in addition to the Saratovskaya-29 variety, the workers in Pavlodarskiy Rayon are sowing new and promising varieties of strong and durum wheat over large areas. /Text/ /Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 15 May 82 p 1/ 7026

SOWING IN TWO SHIFTS--Pavlodar--Hundreds of sowing detachments and complexes have been moved out onto the expanses in Pavlodarskiy Rayon. All of them are being operated in two shifts. A sliding scale for work by the machine operators has been introduced into operations. The units have been staffed by experienced personnel. For the period of sowing work, many repair workers are being used for operating the tractors and use is also being made of students from professional technical schools and agricultural schools. The decision has been made in all areas to complete the sowing of grain crops on 1.87 million hectares in just 10-12 days. The fields of arable land have been increased mainly by improving arid lands and developing solonchak tracts. The majority of the land was plowed in the fall. Snow retention ridging work was carried out on all of the tracts three times during the winter and spring retention and turning over of the moisture has been conducted in the spring. A considerable portion of the areas was supplied with hundreds of thousands of additional cubic meters of water from the Irtysh River and irrigation canals. Four hundred and two party and 224 party-komsomol groups are carrying out sowing work and hundreds of motor vehicle stores, motor vehicle clubs and agitation brigades are in operation. /Text/ /Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 16 May 82 p 1/ 7026

IN DAMP SOIL--Pavlodar--The last of the oblast's rayons -- Kachirskiy, Zhelezinskiy and Irtyshskiy -- have joined in the mass sowing of wheat. Grain crops have already been sown on one third of a million hectares. Commencing with the very first days, a maximum amount of attention has been given to the quality of the sowing work. At the Kolkhoz imeni Uritskiy in Uspenskiy Rayon, the quality is being monitored by specialists and people's control posts, the structure of which includes veterans of labor. Prior to being moved out onto the tilled plots,

all of the sowing machines were adjusted for the required seed planting depth. This makes it possible to place them in a moist layer and thus it ensures uniform and healthy shoots. Mineral fertilizers are being applied to the drill rows. On this and other farms throughout the rayon, wheat is being grown over large areas following beds of perennial grass. These beds were plowed early in the spring and packed. The rollers follow in the tracks of the units carrying out pre-sowing tilling of the arable land around-the-clock. Only anti-erosion sowing machines are being employed. All of the sowing units are being operated in two shifts. On farms in Kachirskiy and Zhelezinskiy Rayons the work is being carried out during the best periods, with the farm dispatcher services furnishing assistance in eliminating idle time. /Text/ /Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 26 May 82 p 1/ 7026

NEW POTATO TECHNOLOGY--Cherkessk, 15 Feb--The potato growers in the Karachayev-Cherkesskaya AO have planned new goals -- by the end of the five-year plan, to raise the production of potatoes to 114,000 tons and its cropping power to 200 quintals. They will be aided in this regard by the experience accumulated by the farmers in the Severo-Osetinzksya ASSR, who are successfully employing a conveyer belt-ridging method. During a weekly inspection conducted at the Kolkhoz imeni Lenin in Zelenchukskiy Rayon, where an oblast school for leading experience has been created, the potatoe growers studied the new technology. Last year, some farms and leading teams used this technology and obtained 200-270 quintals of tubers per hectare. At the present time, the specialists are defining more precisely their technological charts, having already prepared all of their soil cultivation and planting equipment. /by D. Daurov/ /Text/ /Moscow SEL'SKAYA ZHIZN' in Russian 16 Feb 82 p 1/ 7026

POTATO FIELDS EXPANDED--Ordzhonikidze--The specialized farms in the Severo-Osetinskaya ASSR are planting their potatoes using the tested ridging method. The tubers are being planted in ridges prepared in the autumn; the earth in these ridges has already warmed up. This year the potato fields of the autonomous republic will be expanded considerably and new regionalized varieties will be planted. The goal of the farmers -- to obtain 250-300 quintals per hectare of the "secondary grain" in the piedmont zone. /Text/ /Moscow GUDOK in Russian 1 Apr 82 p 1/ 7026

SALES TO STATE--Bolnisskiy and Marneul'skiy Rayons are large-scale suppliers of early potatoes in the industrial centers of the country. Notwithstanding unfavorable conditions, the planting of these potatoes was completed during the best periods. Early potatoes will be grown in the republic on 7,000 hectares. The pruning of trees, vines and tea bushes is nearing completion. At the present time, the tilling of the inter-row spaces is proceeding at a maximum tempo. Although there are many difficulties, nevertheless the republic's farmers are not retreating from the obligations they undertook. This year they plan to sell to the state 152,000 tons of grain, 180,000 tons of potatoes, 510,000 tons of fruit, 780,000 tons of grapes, 490,000 tons of high quality tea leaves, 195,000 tons of citrus fruit, 352,000 tons of vegetables and 110,000 tons of sugar beets. /by R. Zlatkin/ /Moscow SEL'SKAYA ZHIZN' in Russian 16 Apr 82 p 1/ 7026

ARMENIAN SPRING FIELD WORK--Not all of the farms are evidencing concern for the timely acquisition of potato seed and, as a result, the optimum sowing periods are passing. Meanwhile, on farms in Aniyskiy and Aparanskiy Rayons the tasks for

planting this food crop have still not been completed. Of the 11,500 hectares called for, the transplanting of seedlings and the sowing of vegetable crops have been carried out on only 10,000 hectares throughout the republic. Distinct from previous years, serious attention is being given to sowing by varieties, with special emphasis being placed upon the sowing of eggplant, pepper and okra. However, inspections organized by the Central Committee of the Communist Party of Armenia and carried out in the various areas have shown that this important requirement is still not being properly observed on many farms in certain rayons. Thus, on hotbeds at a kolkhoz in the village of Yeraskhaun in Oktemberianskiy Rayon, weeds have rendered worthless the eggplant seedlings. The sowings of garlic on farms in the villages of Dostlu and Nizami in Masisskiy Rayon have turned out to be of less than full value and a critical shortage of eggplant seedlings is being noted here and also at the Gekhanistskiy Sovkhoz -- pepper.

Based upon a decision handed down by the party and government, the plans call for a considerable increase in the production of melon crops. This year, 3,300 hectares will be made available for these crops throughout the republic. However, as yet they have been sown on only 1,282 hectares, with all of the rayons which grow melon crops lagging behind. A vital task of the day is that of steady fulfillment of the tasks for the sowing of all vegetable and melon crops and in the volumes called for. A priority task of the ministries of agriculture, fruit and vegetable economy, land reclamation and water management and the food industry, Goskomsel'khoztekhnika, the State Committee for Forestry and the rayon, party, soviet and agricultural organs is that of undertaking measures aimed at providing the field crop growers with maximum assistance and cooperation in the work of completing the spring agricultural work during the best periods and on a high level and creating firm prerequisites for implementing the food program adopted during the May (1982) Plenum of the CC CPSU. /Excerpts/ /Yerevan KOMMUNIST in Russian 30 May 82 p 3/ 7026

EARLY POTATO PLANTINGS--Bryansk--The mechanized teams of kolkhozes and sovkhozes throughout the oblast have commenced their planting of early potatoes. Large areas have been set aside for early ripening varieties. As a rule, the tubers are being planted in ridges prepared in advance. /Text/ /Moscow TRUD in Russian 15 Apr 82 p 1/ 7026

BRYANSK POTATO PLANTATIONS--Bryansk--The oblast's kolkhozes and sovkhozes have commenced their pre-planting sorting of seed potato tubers and their germination. The potato plantations in Bryanskaya Oblast are the largest in the Russian Federation. They occupy an area of more than 116,000 hectares. Almost one tenth of the farmers are planting early or medium-early varieties. At the present time, the potato growers in all areas are preparing to move out onto the fields. The formation of 900 mechanized teams has been completed. /Text/ /Moscow SEL'SKAYA ZHIZN' in Russian 25 Mar 82 p 1/ 7026

POTATO SEED STOCK COMPETITION--Kalinin, 29 Dec--The potato fields at kolkhozes and sovkhozes in the upper Volga region occupy in excess of 70,000 hectares. This year the oblast's farms sold more than 315,000 tons of tubers and successfully fulfilled their obligations. The farmers are presently evidencing concern for the future harvest. During these winter days, importance is being attached to protecting the seed. Thus, the seed is being sorted in those areas where such a requirement exists. The agricultural production administration of the oblast executive committee and the oblast committee of the professional trade union for agricultural workers have developed the conditions for a competition among the collectives of farms, brigades and officials for the complete protection of the potato seed stock. The plans call for the issuing of material and moral incentives to the winners of the competition. /by D. Prosekov/ /Text/ /Moscow SEL'SKAYA ZHIZN' in Russian 30 Dec 82 p 1/ 7026

RECORD POTATO SALES--Kalininskaya Oblast--In all areas, the cultivation of potatoes on farms in Kalininskaya Oblast has been assigned to mechanized teams. There are presently more than 800 such teams in the oblast. During the winter, all of the team leaders received training at the oblast school of the agricultural administration, where they studied a progressive technology for the growing of potatoes and the experience of leading machine operators throughout the oblast. The fields have been better supplied with organic fertilizer than was the case last year; an average of 45-50 tons has been applied to each hectare. The high quality plantings have been almost doubled. During the first year of the five-year plan, the farmers in Kalininskaya Oblast sold a record amount of potatoes to the state -- more than 300,000 tons. This year the plans call for an increase in potato production. The machine operators in Kalininskiy, Firovskiy, Toropetskiy and Molokovskiy Rayons are carrying out their work out on the potato fields in an organized manner. The potato growers in Molokovskiy Rayon, who are obtaining the highest yields in the oblast, are displaying a high level of organization in carrying out their spring field work. Their goal -- to obtain 170 quintals of tubers from each hectare. /by D. Prosekov/ /Excerpt/ /Moscow SEL'SKAYA ZHIZN' in Russian 11 May 82 p 1/ 7026

POTATO SEED STOCK PREPARATION--Kaluga, 25 Mar--Each year the farmers on many farms throughout the oblast successfully cultivate early potatoes. They are presently engaged in preparing their seed stock. A special brigade at a storehouse of the Kolkhoz imeni Ordzhonikidze in Kosel'skiy Rayon has placed in storage, for vernalization purposes, the initial 100 tons of tubers. Potato vernalization work has commenced at the Kolos Kolkhoz in Sukhinichskiy Rayon and on other farms. The oblast's potato growers are fully resolved to prepare for and to cultivate their fields and to plant them thoroughly during the best agrotechnical periods. /by A. Glazkov/ /Moscow SEL'SKAYA ZHIZN' in Russian 26 Mar 82 p 1/ 7026

RECOMMENDED BY SCIENCE--Khabarovsk, 23 Apr--A meeting of the scientific-technical councils of the ministries of agriculture for the USSR and the RSFSR, held in Khabarovsk, was devoted to those problems concerned with the extensive introduction of the ridge-row technology. Scientists, specialists and designers all participated in this meeting. They underscored the need for introducing this technology into operations based upon the use of a complex of specialized machines, the production and improvement of which will aid not only the farmers in the Far East but also those in the nonchernozem zone of Russia and in Belorussia, where the soil is also subject to excessive moisture during the summer months. /Text/ /Moscow SEL'SKAYA ZHIZN' in Russian 26 Mar 82 p 1/ 7026

KHABAROVSKIY KRAY POTATO PLAN--Khabarovsk--Yesterday the farms in southern Khabarovskiy Kray began planting their potatoes under unusually complicated conditions caused by an excessive amount of moisture in the soil. Highly productive varieties of tubers are being planted -- Pioner, Gatchinskiy and Ogonek. Having undertaken raised socialist obligations, the potato growers at a majority of the sovkhozes and kolkhozes in the Priamur'ye region have resolved to carry out their planting work during the best periods -- within 100-120 hours and to obtain up to 150 quintals of tubers from each hectare. /Text/ /Moscow TRUD in Russian 25 Apr 82 p 1/ 7026

NEW FILATOVSKIY POTATO VARIETY--The farmers, jointly with the maritime region plant breeders, are successfully solving the problem of supplying the residents of Vladivostock with locally produced potatoes. The new Filatovskiy variety, which

was bred and regionalized here, is uniquely adapted to the soil-climatic conditions prevailing in the kray and is producing yields of up to 400 quintals of tubers per hectare. "The contribution being made by our plant breeders in carrying out the food program is not restricted to just potatoes" stated the director of the Primorskiy Kray Scientific Research Institute of Agriculture A. Chayka, "During the last five-year plan, ten new varieties of various agricultural crops were bred and regionalized." /Text/ /Moscow PRAVDA in Russian 7 Jun 82 p 2/ 7026

EQUIPMENT REQUIREMENTS STRESSED--At kolkhozes and sovkhozes in Kalininskaya Oblast, potatoes are grown on more than 70,000 hectares. Almost 319,000 tons of tubers were sold to the state last year. The best results were obtained on those farms where use was made of mechanized teams and where the agrotechnical requirements were observed in a very strict manner. After critically analyzing the annual results, the oblast's potato growers resolved to increase the cropping power of their tubers considerably this year. Towards this end, seed was placed in storage and organic fertilizer moved out onto the fields: no less than 50 tons will be applied to each hectare. However, some problems cannot be solved on the spot. The farms are experiencing a critical requirement for potato planters and cultivator-hillers. Goskomsel'khoztekhnika is able to satisfy only one fourth of the requisitions for them and for sorting points -- only one half. The workload for one planter or cultivator-hiller is 100-150 hectares. We have a need for BRU-0.7 chain and rotary harrows. The production of UBD-3 and KIR-1.56 haulm harvesting machines must be restored. The advantages of the local method for applying mineral fertilizers have been publicized for many years. But the production of cultivator-hillers for applying the principal fertilizer during ridging work has still not been organized. The farms, by virtue of their own efforts and partially with the assistance of raysel'khoztekhnika, are designing and producing devices for the handling of seed stock in connection with a bulk-flow-line technology. All of this involves great expenditures. Considerable areas of arable land in the central and western regions of the oblast are cluttered with stones. There is nothing available for removing them. As yet there are no stone-removal machines for even gathering up small types of stones. The majority of our farms are experiencing a sharp requirement for potato storehouses. The plans for the current five-year period call for the construction of standard storehouses for 160,000 tons. This would seem to be a minor requirement. But the plans are not always successful. For example, the ventilation called for may not ensure an optimum storage regime for the tubers and, as a result, one fifth of them spoil. Nor are there any standard plans for stationary potato sorting points. Thus it remains for each farm to invent and improvise. There is still one other unresolved problem -- potato seed production. The Rossemkartofel' All-Russian Production-Scientific Association for Potatoes has still not developed a system for the centralized supplying of the scientific-research institutes with the initial stock for new varieties, grown on a non-viral basis. /by V. Dyakin, head of the Agricultural Department of the Kalininskaya Oblast CPSU Committee and Candidate of Economic Sciences/ /Excerpts/ /Moscow SEL'SKAYA ZHIZN' in Russian 12 Mar 82 p 2/ 7026

ANNUAL POTATO ACREAGE INCREASES--Elista--The farmers in the Kalmykskaya ASSR have completed their planting of potatoes. For the very first time, many farms have set aside considerable areas of irrigated land for the growing of potatoes. This year the plans call for the potato requirements of the population in the steppe kray, potatoes which traditionally have been imported from other oblasts, to be satisfied by almost 25 percent by means of internal production. For the future, the decision has been made to annually expand the area used for this crop in the autonomous republic. /Text/ /Moscow GUDOK in Russian 26 May 82 p 1/ 7026

## LIVESTOCK FEED PROCUREMENT

### FEED PROCUREMENT OVERVIEW, DEFICIENCIES NOTED

Moscow SEL'SKAYA ZHIZN' in Russian 19 Jun 82 p 1

Article by M Glinka, zootechnician: "Feed Procurements -- In the Forefront of Our Concerns"

Text According to data supplied by the USSR CSA, by 14 June natural and sown grasses had been cut down on 10.3 million hectares, including for haylage and hay -- on 7 million hectares. The country's kolkhozes, sovkhozes and inter-farm enterprises procured 4.6 million tons of hay, placed 9.3 million tons of haylage in storage and produced 798,800 tons of artificially dehydrated feed.

This year the field crop growers, meadow culture experts and machine operators are confronted by great and important tasks. In conformity with the food program of the USSR, during this current five-year period the production of all types of forage must be raised to 500 million tons of feed units. And this means that their procurements must be increased by roughly 100 million tons of feed units. And this work must be started immediately and, as stated during the May Plenum of the CC CPSU, occupy a place in the forefront of our concerns.

Fine prerequisites have been created on the country's farms for carrying out an important task. The sowings of forage crops have been expanded by 1.8 million hectares, with the areas for perennial grasses being increased by 2 million hectares. Greater quantities of fertilizer have been allocated for these crops. This year forage crops have been planted on approximately 6 million hectares of irrigated land, with one half of this area of guaranteed feed production to be used for highly productive and high protein alfalfa. The magnitude of the role to be played by irrigated fields in strengthening the feed base is revealed by the following example: this year the republic's farms in Central Asia obtained 60-70 quintals of hay per hectare from just one cutting on irrigated land.

The period for mass haying operations has arrived in other regions of the country. In all, this period in which it is possible to obtain high quality grass feed containing a large quantity of nutrients lasts for only 8-10 days. And these days are passing. Meanwhile, the rates for cutting down the grasses are not very high on many farms.. In the Uzbek SSR, for example, the best periods for carrying out the first cutting occurred in May. The leading farms have completed their second cutting and are making preparations for a third one. The republic's machine

operators have more than 11,000 tractor mowers and approximately 7,000 mower-mincers at their disposal -- a sufficient number for harvesting all of the grasses during the best periods. But a considerable portion of this equipment has not been moved out onto the fields. As a result, the feed procurement rates in a number of rayons are lower than those of last year. Thus the first cutting of grasses has been carried out on 150,000 less hectares than was the case last year at this same time and 670,000 less tons of haylage have been procured. And indeed May and the early part of June are the best periods in Uzbekistan in which to procure this feed.

Many farms in Grodnenskaya, Mogilevskaya, Minskaya and Vitebskaya Oblasts were late in joining in the feed procurement work.

For the republic on the whole, the grasses cut down and the haylage procured were less than the figures for the middle of June last year. In the Ukrainian SSR, the kolkhozes and sovkhozes in Cherkasskaya, Zhitomirskaya, Khmel'nitskaya, Vinnitskaya and Chernigovskaya Oblasts have fallen behind in cutting down their grasses.

An alarming situation has developed in a number of oblasts in the Russian Federation. For all practical purposes, hay and haylage procurement operations have not yet commenced in Ivanovskaya, Kalininskaya, Gor'kovskaya Oblasts or in the Bashkirskaya and Chuvashskaya autonomous republics. The rates for carrying out this work in Kurskaya Oblast are lower than those for last year. The leaders of some farms are still waiting for the "grasses to grow." Some are hoping for rain while others are awaiting a warm spell. But in both instances the grasses have reached a stage where the accumulation of nutrients has ceased, the plants are growing old and their quality is declining with each passing hour.

Those who are dragging out the cutting down of the grasses are causing twofold harm to their farm -- a sharp reduction takes place in the quality of the feed being procured, especially with regard to the protein content and its digestibility, and a decrease is also recorded in the amount of forage placed in storage, since a minimum of at least one cutting is lost. Last year this mistake was made by many leaders and specialists: despite favorable conditions (in a majority of areas, the year was considered to be a good one from the standpoint of grass), the first cutting was lost on millions of hectares. This cannot be allowed to happen this year.

Unfortunately, in organizing the feed procurement operations, proper emphasis was not placed upon achieving high grass mowing rates in many areas. Monthly campaigns devoted to feed procurement operations have already become customary. This is a useful initiative. But for the haying work to last a month -- this is too long a period. Particularly in view of the fact that the availability of equipment is making it possible for many farms to complete this work within shorter periods of time.

Such a "monthly oblast campaign" commenced on 25 May on Volgograd farms, during which period the plans called for no less than 600,000 tons of hay -- 65 percent of the annual plan -- and more than 68,000 tons of grass meal to be procured. Two thirds of the planned period have already elapsed. And what is the result? The grasses have been cut down on only one third of the areas, 126,000 tons of hay have been procured (14 percent of the amount planned) and artificially dehydrated feed -- 9,500 tons (6 percent).

Meanwhile, Volgogradskaya Oblast does not occupy last place among the oblasts in the Volga region in terms of its grass mowing rates. In Penzenskaya Oblast, the month's campaign began one half month later -- on 10 June. The technical equipping of the oblast's farms is making it possible to carry out the mowing of perennial grasses for hay during 6 days and the stacking in just 7 working days. A powerful pool of drying units is capable of producing no less than 2,000 tons of dehydrated feed daily. Compare this data with the following figures: by 14 June the grasses in the oblast had been cut down on 5 percent of the areas, the procurement plan for hay was fulfilled by 0.7 percent, 3,300 tons of dehydrated feed had been produced and no work had as yet commenced with regard to the laying in of haylage in the oblast.

There are many farms, rayons and entire oblasts throughout the country which are performing fine feed procurement work. The farms in the Kalmykskaya ASSR have already placed in storage almost one half of the planned amount of haylage and those in the Dagestanskaya ASSR -- more than three fourths. Haying operations have been organized very well in Khersonskaya Oblast, where the first cutting is already nearing completion, and also in Krymskaya, Dnepropetrovskaya, Khar'kovskaya and Odesskaya Oblasts in the Ukrainian SSR and in Taldy-Kurganskaya and Chimkentskaya Oblasts in Kazakhstan. Each day the green harvest brings to light more heroes and valuable initiatives are multiplied. The feed procurement specialists in Limanskiy Rayon in Astrakhanskaya Oblast have vowed not only to satisfy fully the feed requirements of the farms but also to create a reliable carry-over supply of forage. In Kustanayskaya Oblast, following the example of workers in Borovskiy and Taranovskiy Rayons, a movement to create a reliable supply of feed is expanding. The collectives of leading enterprises in Gor'kiy have undertaken to furnish assistance to the farms in accelerating the procurement of forage. The example being set by these leading enterprises should be made available to all. Only in this manner will it be possible to carry out an urgent task -- to procure the required quantities of hay, haylage and other feeds within the shortest possible time.

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CSO: 1824/398

## AGRO-ECONOMICS AND ORGANIZATION

### STRENGTHENING EFFECTIVENESS OF SUBSIDIARY ENTERPRISES

Moscow AGITATOR in Russian No 7, Apr 82 pp 29-31

Article by G. Shmelev, professor of economics: "The Enterprise's Subsidiary Farm: Methodical Cultivation"

Text The 23d CPSU Congress has set a goal to increase the production of meat, milk, potatoes, vegetables and fruit on subsidiary farms of enterprises, organizations and establishments. Speaking at the November, 1981 plenum of the CPSU Central Committee, Comrade L. I. Brezhnev stressed the necessity of expanding local productive resources and the capabilities of subsidiary farms. He said that it is necessary to show initiative and enterprise.

Conversations and speeches at this theme all called for assistance in responding to the demands of those in production cooperatives to facilitate the formation of subsidiary farms where there are none, to develop those already in existence, and to increase their efficiency by active participation of the enterprises' workers.

The problem of production, as Comrade Brezhnev observed, is in an economic and political sense, the main problem of the Five-Year Plan; to solve it, all possibilities, all resources must be used--this includes subsidiary farms. The CPSU Central Committee and the USSR Council of Ministers issued a decree in December of 1978: "On Subsidiary Farms of Enterprises, Organizations and Establishments."

This document set forth the basic principles of organization and activity of such farms; their means of obtaining land, high-quality seed, planting materials, young animals for breeding, farm machinery and equipment. Financial credit of up to six years has been extended to cover expenses on the organization and expansion of subsidiary farms.

It is particularly important to note the establishment of farms in remote areas where delivery of agricultural products is difficult, and in populated areas where agriculture is not sufficiently developed.

In the last three years alone almost half a million hectares have been allotted to subsidiary farms, and 4,000 hothouse farms and hog feeding centers have been set up. More than R 200 million of credit has been extended for the development of the material and technical base of enterprises' agricultural sub-production units.

At the beginning of the present Five-Year Plan there were about 80,000 subsidiary farms. In 1980 they produced 450,000 tons of meat, more than 1.1 million tons of milk, 810 million eggs, about 400,000 tons of potatoes and 284,000 tons of vegetables. This is a significant addition to centralized food supplies. This addition is particularly felt on those collectives where, showing initiative, efficiency, perseverance and a serious concern for their development, agricultural production sectors have been set up.

Here are several such examples. The Chelyabmetallurgstroy association received from its farm the following products per worker in 1980: 50 kg of meat, 190 kg of milk, 242 eggs.

There are 400 pigs, a cattle farm and a chicken farm for 22,000 broilers on the agricultural production sector of the Krasnyy Aksay factory of Rostov oblast. These products then are delivered to cafeterias, buffets and stores within the enterprise. Prepared meats and chicken are for sale here.

Workers of the Sibayskiy elevator in the Bashkir ASSR have laid out a garden in a vacant plot of land, have set up greenhouses and built a pigsty. This has lowered the cost of meat and vegetable dishes in the cafeteria; a glass of koumiss, two tomatoes and two apples are served free for lunch each day.

At the Verkh Isetskiy metal works of Sverdlov oblast a closed, tailing-free water supply system has been introduced, thus freeing up about 1,000 square meters of settling ponds. Netted areas for the breeding of mirror carp have been put in. Hundreds of centners of fish are now available each year in the cafeterias and stores of the plant.

The Moscow cotton works of Andizhanskaya oblast has a substantial subsidiary farm. It has more than 2,000 chickens and 50 cows. Cucumbers, tomatoes, cabbage, other vegetables, even lemons are grown in hothouses. All of this produce goes to the factory's cafeteria.

It is well to cite such convincing examples of the high degree of efficiency of subsidiary farms belonging to well-known or even neighboring enterprises or to those in one's own enterprise, if it has an agricultural sector, as well as examples of their benefit for the collective. And it is also appropriate to point out that such sectors not infrequently render material help to workers and employees in the development of their own farms, of collective market gardening and horticulture by selling or allotting seed, seedlings, piglets, providing certain types of work, and offering a centralized market for surplus products.

For sure, not every enterprise, especially a small one, can have its own agricultural production sector. But that is not really important; small enterprises can set up their own farms on a shared arrangement, joining their means and resources.

Subsidiary farms, while giving much to the collective, deserve a lot of care, especially at the beginning. The best and the most favorably situated lands, obviously, have been used for a long time by kolkhozes and sovkhozes. Poorer lands and those that have been neglected are usually allotted to enterprises. They must be worked over, cultivated, fertilized, frequently roads must be laid out to them. It is not so simple to set up farms and hothouses and then furnish them with the necessary equipment. What is needed here is initiative, determination, the concerted efforts of leaders and laborers.

We can see initiative in the following examples: unused, escaping heat from the enterprise sensibly used to warm hothouses, slag used for fertilizer on lands to be recultivated. Or over empty mining areas begin the cultivation of field mushrooms, and in worked-out quarries set up reservoirs for fish. Or point out construction sites, motors and machines no longer in use; after fixing them up, they can be used on subsidiary farms.

But the main point is to use one's talents, knowledge and experience, to strive to the best of one's abilities, keeping the common good in mind. In this manner the collective of the Sumskiy automobile industrial association, M.V. Frunze, acted when they decided to set up a hog farm for 1,000 animals. The builders worked out the plans for automatic feed and swill dispensers, the apparatus for the removal of wastes. Workers from the main sectors of the plant and from the repair shop overhauled and set up the machinery.

In the summer of last year the Yurginskaya motor transport depot in Kemerovskaya oblast was allotted some land for a hog farm. And the collective decided that on the actual construction everyone should work eight hours. Unpaid work--yes, but it's for yourself. Everyone worked in a friendly atmosphere, conscientiously. In a short time they had built a brick pigsty for 300 head, a barn for 100 tons of feed, a summer shelter for sows, a slaughterhouse with a refrigerated area, and extended the power line an additional kilometer. This year they are planning on having between 40-50 kg of pork per worker.

Labor is needed on subsidiary farms. There is usually a full-time staff of specialists and workers for the animals and hothouses. For the harvest and for feed production people from plant shops and departments are needed. The subsidiary farm of the Leningrad optical-mechanical association is located near the plant's recreation area, where the lodge, camping area and Pioneer camp are located. People combine rest with hay making.

The Novolipetskiy metal works has set up a norm: on the basis of each worker no less than 100 kg of greens must be produced in season for the subsidiary farm. Going out into the factory's recreational zone, hundreds of workers take up a scythe and mow the meadows, unproductive lands and islands. Factory employees also help the combine workers to harvest on forage fields and to repair machinery. Factory mechanics are helping to systematically mechanize the farms. Each factory shop takes charge of certain objectives, and indicators of such "sponsorship" can be seen when the results from socialist competition are totalled up. And there are specific incentives:

the more active shop collectives in such a sponsorship arrangement receive the better produce of the subsidiary farm for their cafeterias.

At most enterprises, the agricultural sector is predominantly engaged in livestock raising. Collectives are tending more and more to gather and use food wastes. For example, on the subsidiary farm of the S. Ordzhonikidze mine in Novokuznetsk, these wastes make up three-fourths of a pig's feed ration, and on the farm of the industrial association Salavatnefteyorgsintez of the Bashkir ASSR, they constitute four-fifths.

In conclusion, it is necessary to consider the performance of the subsidiary farm, when there is one, and how to increase its efficiency and what to expect along those considerations from the workers of the enterprise. Agricultural sectors of enterprises, with careful and attentive work, can markedly improve the food supply to workers. And it is necessary to take advantage of this possibility.

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## AGRO-ECONOMICS AND ORGANIZATION

### NEW PROCUREMENT PRICING SYSTEM FOR POTATOES OUTLINED

Moscow ZAKUPKI SEL'SKOZYAYSTVENNYKH PRODUKTOV in Russian No 6, Jul 82 pp 19-21

[Article by Ye. Titov, division head of state inspectors, USSR State Ministry of Procurement: "What the New Purchase Prices Mean"]

[Text] In the last few years the party and the government have taken a number of steps aimed at increasing the production of potatoes and their sale to the state and increasing the state's market supply. One of the ways of increasing production and procurement of potatoes is, first of all, improving the system of planned purchases and prices.

It is well-known that after the March 1965 plenum of the CPSU Central Committee and in the following years, purchase prices of potatoes increased while retail prices remained the same. Improving this pricing arrangement allowed for a growth in revenue and a material increase in interesting agricultural collectives to raise production and sale to the state of this "second bread" in the fulfillment and over-fulfillment of established production quotas.

In addition to an increase in purchase prices, a stimulus was also provided by a payment to the farms for produce sold in excess of the quota at a price 50 percent greater than the purchase price.

In November of 1980 the CPSU Central Committee and the USSR Council of Ministers issued a decree, "Improving Planning and Economic Stimulation in the Production and Purchase of Agricultural Products," in which specific economic measures were pointed out, leading to a further increase in the production and purchase of agricultural products, including potatoes. In addition to increasing efficiency in state production on the basis of speeding up scientific-technological progress and intensifying factor development, the decree envisages a further increase in the purchase price of potatoes. Most union republics use the prices as a stimulus for production and purchases of high-grade products, approved and brought into use since January of 1981.

In accordance with the above-mentioned decree, the RSFSR has introduced new purchase prices for late food and processing varieties of potatoes, differentiated along six zones, and prices for early potatoes differentiated along nine zones of the Russian Federation. The extent of the prices established depends upon the quality and the term of sale; it has a large bearing on increasing

profits in the potato production. The perfection of the system of prices and their determination by zones were introduced in accordance with local conditions and directed towards increasing the output of labor.

If the prices for late potatoes established by zones from September 1 are the same: from R 112 to R 160 per ton, and for processing potatoes the same everywhere at R 95, then purchase prices for early potatoes are divided up into six periods: up until July 11th, from July 11-20, from July 21-31, from August 1-10, from August 11-20, and from August 21-31. From the above purchase periods, the difference in potatoe prices will fluctuate by groups of oblast, krays and autonomous republics from R 420 to R 117 per ton.

Far northern rayons of the RSFSR and other such areas are not included with those zones for late potatoes. The better varieties of eating potatoes ("volzhanin," "detskosal'skiy," "kolpashevskiy," "lyubimets," "penzenskaya skorospelka," "Stolovyy-19," "ul'-yanovskiy," "falenskiy") bought from kolkhozes, sovkhozes and other state farms of the Bashkir ASSR, Checheno-Ingush ASSR, Yaroslav, Voronezh, Kalinin, Kuibyshev, Penzen, Ryazan and Ul'yanov oblasts for sale within these same autonomous republics and oblasts have set purchase prices at R 20 more per ton than the purchase prices.

In the UkrSSR, purchase prices for the better varieties of late eating potatoes and processing potatoes are set up by three oblast groups (zones), differentiated by the time at which they are sold to the state by kolkhozes, sovkhozes, other agricultural enterprises and associations and by the populace. Price per ton of late potatoes under basic conditions are established in rubles for three zones: eating potatoes--99, 104, 119; the better varieties ("White Lvovskiy," "Gatchinskiy," "Ogonyok," "Temp," "Stolovyy-19," "Smachnyy")--132, 135, 139; processing potatoes have the same price for all zones, R 80. In general, purchase prices in the UkrSSR are 12-15 percent higher than those previously established.

Perfection of the system of purchase prices has significantly motivated kolkhozes and sovkhozes to increase the production and purchases of potatoes. Now, in accordance with the above-mentioned decree, instead of paying an amount greater than the purchase price for quantities sold over and above those established by plan, it is now set up so that kolkhozes, sovkhozes, other agricultural enterprises and associations, during the present five-year plan beginning in 1981, are paid an amount 50 percent greater than the average amount during the 10th Five-Year Plan.

This 50 percent addition to potatoe prices is also a great stimulus in increasing profitability in this sector on most kolkhozes and sovkhozes. In spite of unfavorable weather conditions for growing potatoes in 1981, many kolkhozes and sovkhozes of the Bryansk, Leningrad, Moscow, Minsk, Vitebsk, Chernigov and other oblasts of the RSFSR, UkrSSR, BSSR and also LiSSR and LaSSR are being paid the 50 percent addition for surpassing the average amount of potatoes sold during the 10th Five-Year Plan; this amount is from R 60,000 and more and makes up more than one-fourth of the total amount received for potatoes sold. So, for the amount of potatoes sold in excess of the average attained during the 10th Five-Year Plan, the Lenin kolkhoz of Starodubskiy rayon, Bryansk

oblast received R 183,000 or 21 percent of total receipts; the Agro-tehnika sovkhoz of Tosnenskiy rayon, Leningrad oblast was accordingly paid an addition of R 223,000, or 20 percent of total receipts; the Yakhromskiy sovkhoz of Dmitrovskiy rayon, Moscow oblast--R197,000 and 23 percent; and the Lenin kolkhoz of Vitebsk rayon, Vitebsk oblast received an additional payment of R 63,000.

In the RSFSR are 4,169 kolkhozes, sovkhozes and other agricultural enterprises which exceeded the average amount sold during the 10th Five-Year Plan; their additional payment totaled R 54 million. It is significant that under the previous arrangements, the 50 percent additional payment to 1,639 farms exceeding the planned selling quotas of potatoes to the state would have come to only R 40 million. In Chernigov oblast, for example, the new arrangement saw an additional payment of R 6,923,000, while under the previous arrangements it would have been one-half as much--R 3,253,000. Other such examples can be cited from many oblasts of UkrSSR, BSSR, and also LiSSR and LaSSR.

It is typical that, with the introduction of new conditions establishing the 50 percent additional payment, the number of farms has grown and the amount of potatoes sold to the state has increased in comparison to that sold during the 10th Five-Year Plan.

But at the same time there are a good number of farms that, although overfulfilling the planned sale quota of potatoes to the state, did not reach the amount sold during the 10th Five-Year Plan and, therefore, did not receive the indicated additional payment. So the Luzhskiy sovkhoz of Luzhskiy rayon, Leningrad oblast for the years 1976-80 sold an average of 3,937 tons of potatoes to the state; in 1981 it sold 3,445 tons as opposed to the planned quota of 2,800 tons, or 123 percent of the planned quota. The volume sold did not exceed the average amount during the 10th Five-Year Plan, so this farm was not given the 50 percent additional payment. Such farms can receive this additional payment for potatoes only by an increase in the amount of commodities sold in comparison with that during the 10th Five-Year Plan, that is, by obtaining an excellent crop and by increasing the volume sold each year.

Other means have been successfully put into practice in the procurement of potatoes. Purchase prices for early potatoes are two-three times as much as those for late potatoes. Kolkhozes and sovkhozes all receive twice as much earnings from the sale of early potatoes as they do from the late potatoes. Inspite of the fact that productivity of early potatoes is less than that of late potatoes, the profit level of its production is high because of proper price regulation.

For years many farms of our country have been receiving much revenue from selling early potatoes. At the same time, despite favorable climatic and soil conditions for the production and sale of early potatoes in the republics of Trans-Caucasia and Central Asia, northern Caucasia and southern Ukraine, its cultivation and shipment by kolkhozes and sovkhozes of these regions still lags behind demand. Very little is supplied in May, June and the first half of July when prices are highest. The greatest volume of early potatoes comes towards the end of July and in August, just when the huge harvest and sale of late potatoes begins.

To stimulate production and sale of good-tasting and highly marketable potatoes, a number of union republics have set higher purchase and retail prices than for other varieties. According to the price lists, payments in addition to purchase prices for high varieties of eating potatoes brought from farms in a number of RSFSR autonomous republics and oblasts were set from January of 1981 in the amount of R 20 per ton. The purchase price for high variety, regionally produced potatoes in the UkrSSR, amounting to 66 percent of the area given over to cultivation of this commodity by farms of the republic, are set at R 20-33 higher than for other varieties under basic conditions.

Experience in our country's better farms has shown that the cultivation of high variety potatoes greatly improves economic efficiency in this sector, as there are greater yields and increased sale of this commodity to the state, lesser production prices, increased selling prices and a greater farm income. For example, on kolkhozes and sovkhozes of Chernigov rayon, Chernigov oblast, the yield of high variety potatoes during the 10th Five-Year Plan averaged 186 quintals per hectare and a profit from sales of R 4.3 million. On farms of Varvinskiy rayon of this oblast, where more common, lesser-grade potatoes are grown, there were 123 quintals per hectare and hardly any profit. The production costs per quintal on farms of Chernigov rayon in 1980 were R 6.45, of Varvinskiy R 19.96.

Starting with the 1980 harvest in all republics, purchase prices on seed potatoes are two-three times higher than on late processing potatoes; this enables seed farms to have large incomes.

Using high quality seed potatoes that they themselves produced, the Novyy shlyakh kolkhoz of Chernigov rayon attained during the 10th Five-Year Plan a yield of 269 quintals per hectare and lowered production costs of one hectare of seed to R 3.39. This farm's 1980 net profit from the sale of potatoes was R 1,368,000, a profit rate of 275 percent.

Direct marketing of farm products has become widespread in recent years in many republics, krays, oblasts. Experience shows that the sale of potatoes in this manner is economically beneficial for kolkhozes, sovkhozes, other farms and also marketing organizations. By selling potatoes directly to stores, food establishments, children's centers and health care facilities, the farms pay no overhead. Payment for the commodity is the retail price minus a market discount, independent of the transport distance. If the retail price (minus the market discount) is lower than the purchase price, then the stores and food establishments pay the farms the purchase price for the potatoes plus transportation cost.

In perfecting the procurement system for potatoes, much importance is now attached to direct loading and transport of the commodity at the farm and its shipment in vehicles of the procurement agencies. This efficient method is more widespread in RSFSR, KaSSR, ArSSR, TaSSR and KiSSR. In 1980 alone on farms in RSFSR, 945,000 tons were procured in this manner, or 22 percent of the total amount procured from kolkhozes and sovkhozes; in KaSSR, 207,000 tons and

61 percent; in ArSSR, 85,000 tons and 85 percent; in TaSSR, 63,000 tons and 81 percent.

Revenue increases from sales and profitability increases from potato production are determined by the sale price which in turn depends not only on the variety and the selling time, but also on the quality of production. For example, potatoes sold by kolkhozes, other farms and the general populace to distilleries and starch-syrup processing plants are paid at a rate according to the starch content above the amount established by the All-Union State Standard [GOST], with an additional payment to the purchase price for processing potatoes in the amount of R 6 for each ton-percent (instead of the former R 4), and for starch content below the base amount, a like reduction in the purchase price.

For receiving potatoes whose quality does not meet GOST standards from kolkhozes, sovkhozes and other farms, the amount of non-standard potatoes above GOST-established amounts are paid for by procurement agencies to farms at a 28 percent markdown in the purchase price, and by trade organizations and other purchasers at the retail level at a 40 percent markdown in the retail price.

To stimulate kolkhozes and sovkhozes to produce better potatoes for sale to the state, specific measures of encouragement have been devised in certain republics: by using the tare weights of containers in determining the amount of standardized potatoes, kolkhozes and sovkhozes receive financial bonuses; they are also compensated for long term storage that meets official standards.

Experience has shown that it is best to store most of the potatoes close to where the crop is grown. This cuts down on losses during purchasing, transport and storage and has many other advantages. However, the prevailing selling prices for potatoes during the coldest months, December to February, make it not worth the labor and energy of kolkhozes and sovkhozes to store them that long. I feel that these problems need further examination.

Raising the purchase price and making farms a 50 percent additional payment for selling potatoes to the state will bring about an increase in commodity output and be an efficient economic stimulus for an expansion of production and purchases of this "second bread," the economic development of kolkhozes and sovkhozes, and a marked improvement in the well-being of rural workers.

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## TILLING AND CROPPING TECHNOLOGY

UDC 631.62(477)

### TILLAGE PRACTICE ON DRAINED LAND IN UKRAINE RECOMMENDED

Moscow ZEMLEDELIYE in Russian No 3, Mar 82 pp 36-38

/Article by A. K. Beskrovnyy, candidate of agricultural sciences, Ukrainian Scientific Research Institute of Farming: "Problems of Farming on Drained Soil in the Ukraine"/

/Text/ More than 2.5 million hectares of land were drained in the Ukraine, including on an area of about 1 million hectares, by means of closed drainage. During the 10th Five-Year Plan the yield of basic agricultural crops on this land increased, on the average, totaling the following annually: 25.8 quintals of grain crops, 164 quintals of vegetables, 7.2 quintals of flax fiber, 416 quintals of fodder root crops and 33.4 quintals of perennial grass hay per hectare. However, only one-half of the republic's farms reached the yield level envisaged in reclamation plans.

Scientific research institutions and advanced farms in the Ukraine accumulated considerable experience in an efficient utilization of drained land (table 1). Zonal and oblast systems of farming were developed. Their introduction will make it possible to sharply increase the productivity of this soil. The most productive crops and varieties of agricultural crops were selected.

The data of science and advanced practice indicate that it is advisable to use drained mineral soil for grain, fodder and industrial crops and peat soil, mainly for feed production. At the same time, all shallow-lying peat bogs (with a peat thickness of up to 1 meter) should be used for cultivated hayfields and pastures.

The results of investigations conducted by our institute have shown that perennial grass leaves the greatest amount of root residues--80 to 90 quintals per hectare--in soil and root crops (carrots and sugar and fodder beets), quite a negligible amount--0.4 to 4.7 quintals per hectare. At the same time, it has been established that nitrifying bacteria actively develop under row crops in soil (14 to 18 million per gram of absolutely dry peat soil and under perennial grass, only 500,000 to 600,000, the lowest number being under perennial grass of the fourth year of use), cellulose decomposes more strongly and the activity of proteases is higher and that of dehydrogenases and phosphatases, lower than under grass.

Therefore, in crop rotations on drained peat bog soil it is necessary to alternate crops contributing to a rapid breakdown of organic matter with crops slowing down this process and accumulating a considerable amount of organic matter from root, crop and stubble residues. Perennial grass best increases the fertility of peat soil and protects it against pulverization and excessive mineralization of organic matter.

Table 1. Productivity of Agricultural Crops in the Ukraine

Crop	Yield (Quintals per Hectare)		
	in experiments average long-term	maximum	on advanced farms
Grain crops*	35	48	28- 30
Potatoes	280	450	160- 220
Vegetables	600	800	400- 450
Fodder root crops	1200	1860	650-1100
Corn for silage	480	720	300- 350
Perennial grass (hay)	110	180	50- 65
Alternate crops (green mass)	250	350	180- 200

\*On mineral soil with tile drainage

The cultivation of alternate crops is of great importance for an increase in feed production on drained land, as well as for the protection of soil against wind erosion and a reduction in the unproductive losses of nitrogen and other nutritive substances.

Under the conditions of our republic early potatoes, grain crops and fiber flax utilize about 40 to 45 percent of the period favorable for vegetation. A total of 60 to 80 days remain after their harvesting. These days can be utilized for the production of a significant amount of feed in secondary sowings. It is advisable to cultivate oil-bearing radishes, winter rape, pea-oats mixtures and winter rye as alternate crops on peat soil. By the end of October they yield 200 to 250 quintals of green mass per hectare.

From soil occupied by alternate crops nitrogen losses in a gaseous form and through leaching are lowered to two-thirds or one-half as compared with plots without these sowings.

As a result of prolonged stationary experiments in the reclamation of bogs conducted by our institute and the Panfilskaya Experimental Station, the principles of alternation of agricultural crops in fodder crop rotations were developed and efficient crop rotations for medium-thick and thick drained peat bogs were recommended.

The following pairs of successively cultivated crops can be considered the most advisable: perennial grass-potatoes; potatoes-cabbage or root crops; potatoes-potatoes; root crops-corn; corn-potatoes; corn-corn; annual grass-perennial grass.

The regulation of the levels of ground water, the limitation of the depth and number of soil cultivations, in the future the replacement of mechanical cultivations (basic, presowing and interrow) with chemical cultivations (herbicides) and the structure of sown areas play an important role in an efficient utilization of the organic matter of peat soil. On deep and medium-lying peat bogs perennial grass should occupy 50 to 65 percent of the crop rotation area and hayfield-pasture crop rotations (100 percent of perennial grass) should be introduced on shallow peat bogs and peat-gley soil.

It has now been firmly demonstrated on an experimental basis that it is not advisable to use peat in pure form for fertilization, because its effect on the fertility of mineral soil and on the harvest of cultivated crops is negligible and the expenditures on the extraction and application of peat are not recovered.

Numerous investigations conducted in the Ukrainian SSR indicate that the effect from the application of peat-manure composts is higher than from the application of pure peat and peat-mineral composts and, basically, depends on the manure forming part of the compost.

The same can also be said about peat-mineral fertilizers (peat-ammonia fertilizers, peat-mineral and ammonia fertilizers and so forth). The positive effect from their application depends on the amount and composition of mineral fertilizers in the compost. This was convincingly demonstrated by many special experiments of the Ukrainian Scientific Research Institute of Farming and the All-Union Order of the Red Banner of Labor Scientific Research Institute of Fertilizers and Soil Science (1961-1967).

Calculations show that on peat soil the quantity of plant output obtained per unit of mineralized peat with due regard for the unproductive losses of nitrogen is twice to three times as high as the increase in the harvest from the application of the same amount of peat in the form of composts. Therefore, in a number of countries in Europe and America peat is not used as a fertilizer.

It should be noted that for many reasons, including owing to its low thermal capacity, nowhere, with the exception of Iceland, is peat extracted for fuel. Exhausted peat bogs remaining after industrial peat extraction have a low fertility and poorly lend themselves to cultivation owing to a deterioration of their water and physical properties and biological activity.

In connection with the above-stated we believe that it is necessary to legislatively prohibit the extraction of low peat for fuel and fertilization.

Drained land should be developed and utilized according to scientifically substantiated overall long-term plans envisaging a further improvement in the quality of reclamation, performance of work on an improvement in the technical state and reconstruction of existing systems, extensive use of chemicalization and mechanization and the maximum possible rise in the standard of farming. In farming systems developed for Kiev Oblast, as a result of an improvement in the organization of agricultural utilization of reclaimed land, a guaranteed production of vegetables, as well as of succulent feed for animal husbandry, is envisaged.

The growing of fodder crops on reclaimed land makes it possible to increase the gross output of feed as a result of the high yield and to free sizable areas of arable land in dry zones for the cultivation of grain and industrial crops. However, low-productivity hayfields and pastures still occupy sizable drained areas.

We believe that drained land must be utilized only for highly productive areas. If, however, the reclamative state of the soil does not make it possible to obtain even 30 to 40 quintals of perennial grass hay per hectare, such land cannot be considered reclaimed. An additional set of operations for the reconstruction and repair of reclamation systems must be performed on it.

To obtain the programmed high harvests of agricultural crops on drained land, a set of agrotechnical and reclamative measures was developed. A scientifically substantiated fertilization system, regulation of the water regime and introduction of efficient crop rotations and advanced technologies of cultivation of field crops are the key measures.

During a production check of this set of measures at the Panfilskaya Experimental Station, 700 to 800 quintals of the green mass of perennial grass per hectare and 1,300 to 1,400 quintals of fodder sugar beets per hectare were obtained. On mineral soil drained by tile drainage under the production conditions of Zakarpatskaya Oblast the harvest of winter wheat reached 45 to 50 quintals per hectare and of corn grain, 75 to 80 quintals per hectare.

The creation of an optimal food regime and reaction of the soil solution for plants is one of the important elements in the production of programmed harvests.

On the basis of the results of field experiments it is necessary to apply primarily phosphorus-potassium mineral fertilizers to drained peat soil. Nitrogen fertilizers are applied to poorly decomposed peat bogs, as well as to areas sown with perennial grass, beginning from the second year of use. The approximate rates of fertilizers for agricultural crops in crop rotations of varying specialization are presented in table 2.

Table 2. Fertilization System on Peat Soil in Basic Types of Crop Rotations

Number of field	Crop	Yield (q/ha)	Fertilization rate (kg/ha)	
			P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
Fodder crop rotation				
1-5	Perennial grass	60- 70	45-60	100-120
6	Grain crops	25- 30	45-60	100-120
7	Potatoes	220-250	60-80	120-150
	Fodder sugar beets	600-800	75-90	150-180
8	Annual grass	220-300	utilize aftereffect	
Fodder vegetable crop rotation				
1-4	Perennial grass	60- 80	45-60	100-120
5	Potatoes	220-250	45-60	120-150
6	Table carrots	550-750	60-75	120-130
	Table sugar beets	450-500	60-80	120-150
7	Late cabbage	500-600	60-75	150-180
8	Annual grass	220-300	utilize aftereffect	

The fertilizer rates are calculated for soil with an average level of provision with mobile forms of phosphorus and potassium. When the content of these elements in soil is low, the rates must be increased and, when it is high, reduced by 25 to 30 percent. They can be established by the method of computation for an increase in the harvest. For this it is necessary to have the indicators of removal of nutritive substances from soil by the cultivated crops per unit of the harvest and the coefficients of utilization of these substances from fertilizers during the year of application (table 3).

Table 3. Removal of Nutritive Substances by Harvests of Agricultural Crops and Utilization of These Substances From Fertilizers During the Year of Application

Crop	Removal per ton of basic output (kg)			Utilized from fertilizers (%)		
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
On peat soil						
Perennial grass (hay)	-	5-6	16-23	-	44-50	73-100
Grain crops (barley, oats and winter rye)	-	10-12	26-30	-	40-45	60- 65
Potatoes	-	0.9-1.3	4.5-5.5	-	17-22	40- 50
Fodder sugar beets	-	0.7-1.0	4-5	-	44-50	80- 95
Table carrots	-	0.8-1.0	3.5-4.0	-	44-50	80- 90
Late cabbage	-	0.8-1.0	3.5-4.0	-	44-50	80- 95
Corn for silage	-	1.1-1.2	3.0-3.2	-	25-30	65- 70
On mineral soil						
Perennial grass (hay)	17	5	15	60-70	25	70
Grain crops (barley, oats, millet and winter rye)	27-34	9-14	16-29	40-50	20-25	60-70
Potatoes	5	2.2	8	60-70	25	70
Corn for silage	2.5	1.0	3.5	50-60	20-25	60-70

The harvest planned from fertilizers does not at all coincide with the actual harvest under all conditions. Usually, the following general pattern is observed both on mineral and peat soil: The higher the planned harvest, the lower the actual harvest, especially during years unfavorable in terms of weather conditions (insufficient or, conversely, excessive moistening, unfavorable air temperature and so forth). This is confirmed by the results of many experiments. I will refer to some of them.

In the prolonged (1963-1974) experiment of the Ukrainian Scientific Research Institute of Farming on gray podzolic soil, when the planned harvest of sugar beets was lower (434 quintals per hectare), 435 quintals per hectare were obtained and, when it was higher (508 quintals per hectare), 455 quintals per hectare.

For row crops increased moistening usually is favorable for the production of the planned harvest. However, for winter wheat and other grain crops disposed to lodging it can prove to be negative. For example, the possibility of obtaining a planned harvest of 50 quintals of winter wheat per hectare was studied. In 1976, which was a year normal in terms of moistening, 48.3 quintals per hectare were obtained and in 1977, which was wetter, owing to the lodging of wheat, only 35 quintals per hectare.

The system of cultivation of reclaimed soil depends on its type and reclamative state. On the basis of prolonged stationary experiments we recommend on well-drained and cultivated peat soil one plowing in crop rotation at the depth of 23 to 25 cm after perennial grass and surface cultivation with disk implements at the depth of up to 10 cm after other crops. Before sowing soil must be mandatorily disked and packed with heavy water-filled rollers under all crops before and after sowing and under potatoes, only before tuber planting.

On drained mineral soil we recommend the use of varying-depth soil cultivation. The depth of basic cultivation depends on the thickness of the humus layer.

As the investigations of the Ukrainian Scientific Research Institute of Hydraulic Engineering and Reclamation have shown, on gley and gleayed soil it is necessary to use deep hoeing (60 to 80 cm) once in 2 to 3 years. This method contributes to an accelerated penetration of surface water to low-lying soil horizons, especially in places of lows and drainless hollows (minor depressions), accumulation of moisture in the underground soil layer and creation of a stable water regime throughout the entire vegetative period.

Different crops react differently to moistening conditions. In connection with this the construction of reclamation systems should be directed toward the crops that will be grown. Of course, it is cheaper to build a drainage system designed for the cultivation of perennial grass and oats. Such systems predominate on kolkhozes and sovkhozes. As a result, the cultivation of winter grain crops, industrial crops, vegetables and fodder root crops largely depends on the weather and the harvests of these crops decline sharply during years with increased moisture.

Taking into consideration the technical level and economic state of many reclamation systems, we believe that in the western regions of the Ukraine, where the climate is moister, in the next few years the measures for an improvement in the water soil regime should be directed primarily toward the prevention of the water-logging of land. It is necessary to regulate river beds and to keep the drainage network in an exemplary state. On the drained land of kolkhozes and sovkhozes in this zone in the last 15 years the highest harvests were obtained during dry years and the lowest, during wet years. With regard to the eastern regions with their frequent summer droughts, a prompt drain of excess water in spring must be mandatorily combined with irrigation during the dry periods of the year.

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## TILLING AND CROPPING TECHNOLOGY

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### IMPROVED UTILIZATION OF DRAINED LAND IN UKRAINE URGED

Moscow ZEMLEDELIYE in Russian No 5, May 82 pp 40-43

Article by L. P. Golovko, chief of the Main Administration for the Utilization of Irrigated and Drained Land of the Ukrainian SSR Ministry of Agriculture: "Drained Land in the Ukraine Must Be Utilized Efficiently" /

Text/ In the Ukraine, as in other republics in our country, the rates of drainage reclamation especially increased after the May (1966) Plenum of the CPSU Central Committee. During the past 15 years the area of drained land has increased by 1,905,800 hectares, now totaling 2,556,100 hectares. A two-way regulation of the water and air soil regime is carried out on 1,099,900 hectares and closed drainage was established on 1,320,800 hectares. It should be noted that, whereas in 1966-1970 land drained by tile drainage comprised 30.6 percent, in 1976-1980 it comprised 82.6 percent.

The intrafarm drainage network was previously serviced by the forces of kolkhozes and sovkhozes, which were not fully provided with the necessary material and technical facilities, and, therefore, this work often was carried out not on schedule and not in a sufficiently qualitative manner. In 1981 on the basis of contracts with kolkhozes and sovkhozes administrations for the operation of reclamation systems provided technical services for more than 90 percent of the republic's intra-farm drainage network. Their quality improved considerably.

We pay much attention to a correct utilization of drained land, which depends on the classification of soil with one group or another, intensity of its drainage and mineralization of organic matter, as well as farm specialization.

We allocate meadow and peat-bog soil, shallow-lying medium-thick peat bogs with a heavily mineralized arable layer and poorly drained mineral and peat soil mainly for cultivated hayfields and pastures. On drained mineral soil we cultivate basically sugar beets, potatoes, grain crops, fiber flax and fodder crops. In the crop rotation system we utilize a negligible part of medium-thick and thick peat bogs (with a peat depth of more than 1 meter) with a well-regulated water regime, allocating them mainly for hayfields and pastures.

From the data in table 1 it can be seen that from 1965 through 1981 the proportion of arable land in drained areas increased from 37.7 to 54.7 percent and that of hayfields and pastures decreased slightly. However, the area of improved hayfields and pastures increased considerably. Whereas in 1965 they occupied 39.6 percent of the drained meadows, in 1981, 84.1 percent.

Table 1. Structure of Utilization of Drained Areas in the Ukraine (on the Average per Year)

Areas	1966-1970		1971-1975		1976-1980		1981	
	thous. ha	%	thous. ha	%	thous. ha	%	thous. ha	%
Drained agricultural areas	1165.3	100	1487.4	100	1940.0	100	2202.2	100
including:								
arable land	454.7	39.0	652.0	43.9	990.7	51.1	1205.6	54.7
hayfields	458.4	39.3	492.1	33.1	544.4	28.0	582.5	26.5
of them improved	239.8	52.3	361.3	73.4	449.9	82.6	490.8	84.3
pastures	228.4	19.6	318.5	21.4	379.7	19.6	387.3	17.6
of them improved and cultivated	104.0	45.5	237.6	74.6	313.5	82.5	325.1	83.9
perennial plantings	5.4	0.5	5.1	0.3	5.6	0.3	7.1	0.3
private plots	18.4	1.6	19.7	1.3	19.6	1.0	20.7	0.9

The work done on a fundamental improvement in hayfields and pastures made it possible to increase their productivity. In 1981 in Cherkasskaya Oblast an average of 35.2 quintals of hay per hectare were gathered from improved meadows, in Zakarpatskaya Oblast, 31.5 quintals per hectare and in Ternopol'skaya Oblast, 24.3 quintals per hectare. Many farms obtain even more hay. On the Peredovik Kolkhoz in Chernigovskiy Rayon, Chernigovskaya Oblast, 50 to 55 quintals of hay per hectare are annually gathered from improved hayfields, on the Kolkhoz imeni Zhdanov in Korsun'-Shevchenkovskiy Rayon and on the Kolkhoz imeni Kalinin in Zolotonoshskiy Rayon, Cherkasskaya Oblast, 55 to 60 quintals per hectare and on the Kolkhoz imeni Karl Marx in Putivl'skiy Rayon and on the Kolkhoz imeni Kovpak in Krolevetskiy Rayon, Sumskaya Oblast, 45 to 50 quintals per hectare.

However, not all drained meadows have been improved. Therefore, their productivity is very low. In 1981 in Vinnitskaya Oblast only 7.3 quintals of low-quality hay per hectare were gathered from natural hayfields, in Volynskaya Oblast, 13.5 quintals per hectare, in Poltavskaya Oblast, 14.2 quintals per hectare and in Khmel'nitskaya Oblast, 14.3 quintals per hectare. Unfortunately, in some oblasts such land still occupies sizable areas. In Kiev Oblast 13,600 out of the drained 56,900 hectares of hayfields and pastures, or 23.2 percent, still need to be improved. There is a similar situation in Zhitomirskaya Oblast (22.9 percent), in Rovenskaya Oblast (22.8 percent), in Poltavskaya Oblast (50.2 percent) and in others. The lack of seeds of meadow and pasture grass is the main reason for this. Specific measures aimed at a fundamental improvement in all hayfields and pastures on drained land during the current five-year plan have now been developed in the republic and brought to the attention of every oblast, rayon and farm.

On the basis of the data of scientific research institutions and the experience of advanced workers it has been established that on drained mineral soil, depending on the specialization of farms, 35 to 50 percent of the arable land should be allocated for grain crops, 14 to 25 percent, for industrial crops, 12 to 15 percent, for potatoes and vegetables and 30 to 40 percent, for fodder crops. Heavily mineralized thick peat bogs can also be partially utilized for grass, avoiding the

cultivation of row fodder crops. Grain crops on peat bogs can be grown only in Poles'ye, where their harvest is 1.5 times as high as on adjacent mineral soddy-podzolic sandy loam soil. In this zone 20 to 25 percent of the arable land can be allocated for them.

As is well known, on well-drained medium-thick and thick peat bogs containing a sufficient amount of water it is possible to regulate the water regime and to cultivate mainly perennial grass, fodder root crops and corn.

In connection with the change in the rates of mineralization of the organic matter of peat soil the structure of crops cultivated on it changes in time. The area under row crops decreases and the area under annual, continuously sown crops and perennial grass expands. Proceeding from this, every farm determines the optimum structure of sown areas and the corresponding crop rotations.

Table 2. Structure of Sown Areas on Drained Land in the Ukraine (on the Average per Year)

Crop	1966-1970		1971-1975		1976-1980		1981	
	thous. ha	%	thous. ha	%	thous. ha	%	thous. ha	%
Sown area--total	519.0	100	730.5	100	1083.1	100	1280.5	100
Grain crops	201.1	38.7	304.0	41.6	479.0	44.3	584.2	45.6
including:								
winter wheat	111.0	21.4	155.0	21.2	220.0	20.3	256.7	20.0
winter rye	28.0	5.4	31.0	4.2	61.0	5.6		
spring barley	13.0	2.5	50.0	6.8	102.0	9.4		
oats	17.0	3.3	31.0	4.2	45.0	4.2		
corn	8.0	1.5	12.0	1.6	16.0	1.5	32.7	2.6
Industrial crops	52.7	10.2	71.5	9.8	109.8	10.1	128.2	10.0
including:								
sugar beets	19.0	3.7	27.0	3.7	50.0	4.6	61.1	4.8
fiber flax	25.0	4.8	36.0	4.9	51.0	4.7	57.1	4.5
Vegetable-melon crops and potatoes	40.4	7.8	49.1	6.7	67.3	6.2	74.3	5.8
including:								
potatoes	33.0	6.4	38.0	5.2	53.0	49.0	59.4	4.6
vegetables	8.0	1.5	11.0	1.6	14.0	1.3	14.9	1.9
Fodder crops	224.8	43.3	305.9	41.9	426.7	39.4	438.8	38.6
including:								
fodder root crops	20.0	3.9	32.0	4.4	38.0	3.5	41.7	3.2
corn for silage and green feed	46.0	8.9	62.0	8.5	94.0	8.7	111.2	8.7
annual grass								
for hay	8.0	1.5	4.0	0.5	2.0	0.2	1.7	0.1
for green feed	41.0	7.9	69.0	9.4	106.0	9.8	102.0	8.0
Perennial grass sown during past years:								
for hay	42.0	8.1	38.0	5.2	38.0	3.5	59.0	4.6
for green feed	13.0	2.5	48.0	6.6	91.0	8.4	148.0	11.6

From the data in table 2 it can be seen that the proportion of grain crops on drained land in the Ukraine has increased in the last few years. They now occupy 45.6 percent of the sown area. Fodder crops comprise 38.6 percent, vegetable-melon crops and potatoes, 5.8 percent and industrial crops, 10 percent.

It should be noted that on a number of the republic's kolkhozes and sovkhozes the structure of crops on drained arable land needs to be improved through a reduction in low-productive crops. For example, oats, whose average yield is 13 quintals per hectare, occupies almost 50,000 hectares of arable land and in Volynskaya, L'vovskaya and Zhitomirskaya Oblasts from 4,000 to 9,000 hectares are annually allocated for it. In Vinnitskaya, Zakarpatskaya and Cherkasskaya Oblasts sunflower seeds are grown on drained land, yielding a harvest of 3 to 8 quintals per hectare.

Unfortunately, some of the republic's farms do not utilize drained hayfields efficiently. On some of them grass is not mowed, but ruined (livestock is allowed to graze on it). For example, in Rovenskaya Oblast in 1981 only on 18,200 out of 72,900 hectares of drained hayfields grass was harvested for hay, haylage, silage and green feed and on the remaining 54,700 hectares (75 percent) livestock was grazed haphazardly. There is a similar situation in Chernigovskaya Oblast, where on 59.8 percent of the hayfields grass is fed to animals, in Volynskaya Oblast (62.8 percent) and in a number of others.

We attach great importance to the introduction of scientifically substantiated crop rotations on drained land. Their role in the increase in the yield of agricultural crops is well-exemplified by the cultivation of perennial grass. The republic's advanced kolkhozes and sovkhozes on drained natural hayfields obtain 20 to 25 quintals of hay per hectare after superficial improvement and up to 40 or 50 quintals per hectare after fundamental improvement with accelerated grassing. However, in crop rotation sown perennial grass yields up to 90 or 120 quintals of high-quality hay per hectare. It has been demonstrated that the application of 1 quintal of mineral fertilizers increases hay on drained natural hayfields by 3 to 4 quintals per hectare, with accelerated grassing, by 6 to 8 quintals per hectare and in crop rotation, by 19 to 20 quintals per hectare.

The data of scientific institutions and the experience of advanced workers indicate that on drained peat-bog soil, when crop rotations are absent and the alternation of crops is incorrect (frequent cultivation of row crops on the same place), up to 8 or 15 tons of organic matter per hectare are mineralized annually. Therefore, the republic's kolkhozes and sovkhozes try to see to it that drained soil is occupied by cultivated plants throughout the vegetative period, growing alternate crops for this, which yield additional output, enrich soil with organic matter and prevent losses of nutritive substances. For example, on drained peat and mineral soil after the harvesting of grain crops, annual grass and fiber flax a pea-oats mixture, or winter rye for green feed, is sown on fields where corn is to be grown the following year.

The types of crop rotations on drained land depend on the soil and climatic conditions and specialization of farms. Seven-field grain-potato crop rotations, where grain crops occupy 42.9 percent and potatoes, 14.3 percent and flax-grain-potato crop rotations, where flax accounts for 14.3 percent, grain crops, for 42.9 percent and potatoes, for 14.3 percent, and eight-field fodder crop rotations, in which fodder crops occupy up to 60 percent, are introduced on mineral soil drained by tile drainage.

In Poles'ye on drained mineral soil of a light texture and poor in nutritive substances crop rotations with a short rotation--five-field crop rotations--where winter grain crops occupy 40 percent and fiber-flax, potatoes and lupin, 20 percent, are optimal.

On drained peat-bog soil crop alternation depends on the thickness and mineralization of peat. Seven-field fodder crop rotations, where one field is allocated for a pea-oats mixture with the summer sowing of perennial leguminous grass and six fields, for perennial grass, are optimal on shallow-lying and heavily mineralized medium and deep peat bogs. On weakly mineralized peat bogs it is necessary to introduce eight-field crop rotations with three perennial grass fields, two corn fields, one potato field and one root crop field, as well as with grass mixtures for green feed and with the summer sowing of perennial grass. Vegetable-fodder crop rotations with a mandatory saturation with perennial grass of up to 50 percent are effective on medium-mineralized peat bogs. On small plots and only in the Poles'ye zone grain-fodder crop rotations, in which perennial grass occupies up to one-half of the area, can be introduced on this soil.

It is well known that on drained land subsoil moistening increases the harvest of cultivated crops by 20 to 45 percent and sprinkling, 1.5- to 2-fold. For example, stable high harvests are annually grown at the Irpen' Drainage-Moistening System in Kiev Oblast. There in 1976-1980 the Buchanskiy Sovkhoz, on the average, obtained 252 quintals of vegetables per hectare, 310 quintals of corn for silage and green feed per hectare and 485 quintals of perennial grass for green feed per hectare and the Sovkhoz imeni 60-Letiya Sovetskoy Ukrayiny, 265 quintals of vegetables per hectare, 367 quintals of corn for silage and green feed per hectare and 600 quintals of fodder root crops per hectare.

However, the water regime of drained soil can be regulated only if the appropriate hydraulic structures are available. In the republic such structures are available only on 1,099,900 hectares, or on 43 percent of the drained agricultural land, and during the dry period water can be supplied only on an area of 500,000 to 600,000 hectares, because there are no reservoirs and pumping stations. In the next few years, when drainage systems are reconstructed, the bodies of the Ukrainian SSR Ministry of Land Reclamation and Water Resources should ensure a guaranteed water supply for the moistening of drained tracts of land both through subsoil moistening and by means of sprinkling machines.

To obtain high harvests of agricultural crops on drained land, it is necessary to correctly apply mineral and organic fertilizers.

Both mineral and organic fertilizers can be applied to drained mineral soil. Almost 4,000 hectares of gleyed soddy-podzolic soil of a medium and light texture (poor sandy loam soil and sand) were drained on the Kolkhoz imeni 22 S'yezda KPSS in Kostopol'skiy Rayon, Rovenskaya Oblast. On this farm 35 to 40 tons of high-quality peat-humus composts per hectare are annually applied to sugar beets and potatoes and 2 quintals of potash salt, 2.5 quintals of ammonium nitrate and 2 quintals of superphosphate or 2.5 quintals of phosphorite meal, for soil cultivation in spring; 5.5 quintals of kainite to winter wheat in fall and 1.5 quintals of ammonium nitrate and 1 quintal of superphosphate in spring; 0.6 quintals of potassium, 2 quintals of superphosphate and 3.5 quintals of ash to flax and 1 quintal of ammonium nitrate in spring as supplementary dressing. The kolkhoz annually obtains more than 30 quintals of winter wheat and spring barley, 25 quintals of oats, 250 to 300 quintals of potatoes, 350 to 400 quintals of sugar beets and up to 10 quintals of flax fiber per hectare.

Drained peat bogs differ from other types of soil by the fact that the organic mass, that is, peat, which contains 2.5 to 4 percent of nitrogen, but is poor in potassium, trace elements and, especially, phosphorus, comprises 70 to 80 percent of them. As a rule, organic fertilizers are not applied to this soil. Mainly potassium and phosphorus fertilizers and, mandatorily, copper fertilizers in the form of pyritic cinders are applied at the rate of 5 quintals per hectare every 4 or 5 years.

The republic's farms on drained peat soil apply 120 to 150 kg of potassium and 45 kg of phosphorus per hectare to perennial grass, 90 to 100 and 45 kg per hectare respectively to winter rye, 120 to 150 and 45 to 70 kg per hectare to potatoes and vegetables and 120 and 60 kg per hectare to corn for silage. During the current five-year plan, on the average, 8 to 10 quintals of standard mineral fertilizers per drained hectare are allocated specifically for this.

An efficient utilization of drained land in combination with other agrotechnical measures, as well as the strengthening of the material and technical base of kolkhozes and sovkhozes, contributed to an annual increase in the yield of all crops (table 3). However, it does not yet meet the level envisaged in the plans for the construction of reclamation systems. The planned yield of all crops for oblasts, rayons and farms for the period until 1990, which is specific for every five-year plan, has been worked out in the republic. Its attainment is the basic criterion for the determination of the efficiency of utilization of reclaimed land by farms.

Table 3. Yield of Agricultural Crops on Drained Land on Kolkhozes and Sovkhozes in the Ukraine (On the Average per Year, Quintals per Hectare)

Crop, area	1966-1970	1971-1975	1976-1980
Grain crops, total	18.4	23.6	25.6
winter wheat	20.4	24.8	26.7
winter rye	11.1	18.0	19.0
spring barley	22.0	25.0	28.0
corn	32.0	49.0	54.4
Sugar beets	276.0	311.0	319.0
Fiber flax	4.1	5.5	6.2
Potatoes	86.0	111.0	121.0
Vegetables	145.0	157.0	164.0
Fodder root crops	235.0	301.0	320.0
Corn for silage and green feed	136.0	192.0	200.0
Annual grass:			
for hay	28.1	23.5	24.3
for green feed	106.0	129.0	141.0
Perennial grass:			
for hay	28.4	32.0	32.7
for green feed	153.0	182.0	198.0
Hay of natural hayfields	14.8	15.0	17.0
Hay of improved hayfields	18.0	19.2	20.0

The planned yield of corn for grain, potatoes and corn for silage and green feed was attained in the republic in 1981. Many kolkhozes, sovkhozes, rayons and some oblasts ensure the production of the planned yield of most crops. For example, in 1981 the Kolkhoz imeni Zhdanov in Goshchanskiy Rayon, Rovenskaya Oblast, on drained land obtained 51.2 quintals of grain crops, 53.3 quintals of winter wheat, 51.1 quintals of spring barley, 546 quintals of sugar beets and 640 quintals of corn for silage and green feed per hectare. The Zhovten' Kolkhoz in Vladimiretskiy Rayon in the same oblast gathered 41 quintals of grain crops, 66.6 quintals of potatoes, 348 quintals of perennial grass for green feed and 600 quintals of corn for silage and green feed per hectare and the Peredovik Kolkhoz in Chernigovskiy Rayon, Chernigovskaya Oblast, 186 quintals of potatoes, 650 quintals of fodder root crops, 550 quintals of corn for silage and green feed and 55 quintals of hay from improved hayfields per hectare.

All these measures clearly indicate that on drained land, when it is utilized efficiently, when the entire set of agrotechnical and reclamative measures is observed and when scientifically substantiated crop rotations are introduced, it is possible to obtain high and stable harvests of all crops.

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## TILLING AND CROPPING TECHNOLOGY

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### RAPID INTRODUCTION OF SOIL PROTECTIVE FARMING SYSTEM URGED

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/Article by A. I. Barayev, hero of socialist labor, academician of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin: "Opportunities for Soil Protective Farming" /

/Text/ It is well known that in the country's steppe and forest steppe regions droughts recur no less than twice during a 5-year period and in Kazakhstan, even more often. Thus, for the greater part of the USSR arid climate is the natural characteristic feature of its natural conditions. Therefore, the development and introduction into production of reliable farming methods capable of overcoming the destructive effect of droughts on plants are the most important tasks of Soviet agricultural science and agronomical practice.

Is this possible?

A group of scientists at the All-Union Scientific Research Institute of Grain Farming together with other scientific institutions in North Kazakhstan developed a soil protective farming system, by means of which it is possible to reliably protect soil against wind erosion, to lower the negative consequences of periodically recurring droughts and to greatly increase the harvests of grain crops. This farming system is based on crop rotation with clean fallow and soil cultivation at the necessary depth with subsurface implements with the preservation on the field surface of stubble and other plant residues retaining snow during the first snow fall. Snow retention with tractor snow plows is also mandatory. It makes it possible to accumulate a snow cover up to 40 cm high by the end of winter. During its spring thawing moisture penetrates well into soil at a significant depth. The quite high moisture reserves formed in lower soil layers free spring grain crops of the unfavorable consequences of the drought, which is often observed here in June and in the first 10-day period of July. During a rapid and severe desiccation of the upper soil layer wheat plants do not form secondary roots from tillering nodes. The effective activity of embryonic roots, which use moisture from deep soil layers, saves the situation. In Tselinogradskaya Oblast in the last 7 years there was no precipitation in June and the first 10-day period of July of 1975, 1977, 1980 and 1981. However, despite this, the experimental farm of our institute, where the soil protective farming system has long been mastered on an area of 25,600 hectares, gathered quite a good grain harvest--10.5, 12, 16 and 15 quintals per hectare respectively.

The use of the soil protective farming system provides an even greater effect during years with a normal amount of precipitation at the beginning of summer. For example, in 1976 the yield of grain crops on the experimental farm was 20.2 quintals per hectare, in 1978, 20.9 quintals per hectare and in 1979, 25.1 quintals per hectare. During the 10th Five-Year Plan two of the institute's experimental farms, on the average, annually obtained 19.3 quintals of grain per hectare on an area of 33,600 hectares and during the very dry year of 1981, 15.6 quintals per hectare.

Many other farms in Kazakhstan also obtained good results from the use of the soil protective farming system. For example, on the Kolos Kolkhoz in Bulayevskiy Rayon, as well as on the Voskhod Sovkhoz in Timiryazevskiy Rayon and on the Tarangul'skiy Sovkhoz in Moskovskiy Rayon, Severo-Kazakhstanskaya Oblast, on the average, in 1975-1980 the yield of grain crops was 22.5, 21.9 and 20.9 quintals per hectare respectively; on the Kolkhoz imeni Karl Marx in Kustanayskaya Oblast, 19.9 quintals per hectare (during the Seventh Five-Year Plan only 11 quintals per hectare were obtained there).

During that time Berlikskiy, Leninskiy, Kotyrkul'skiy and Zlatopol'skiy sovkhozes, on the average, obtained 16.2, 16.1, 20.4 and 21.5 quintals of grain per hectare respectively. During the 10th Five-Year Plan under even more unfavorable soil and climatic conditions kolkhozes and sovkhozes in Shortandinskiy Rayon gathered 2.8 quintals of grain per hectare more than the average in Tselinogradskaya Oblast (14 quintals per hectare).

Naturally, the mastering of the soil protective farming system in North Kazakhstan on an area of 20 million hectares could not fail to have an effect on an increase in the gross output of grain throughout the republic. For example, whereas in 1949-1953 its average annual production totaled 3.9 million tons and after the development of 25.5 million hectares of virgin land (its plowing) during the Seventh Five-Year Plan, 14.5 million tons, after the March (1965) Plenum of the CPSU Central Committee, which adopted a decision on the introduction of soil protective farming methods and on the organization of the output of antierosion equipment and its delivery to kolkhozes and sovkhozes, the average annual grain production during the Eighth Five-Year Plan reached 20.6 million tons, during the Ninth Five-Year Plan, 21.6 million tons and during the 10th Five-Year Plan, 27.5 million tons. In the last 6 years Kazakhstan's farms increased the sale of grain to the state to approximately 1 million poods annually and thereby fulfilled and even overfulfilled state plans. At the same time, it should be stated that the potentials for an increase in grain production existing in the republic have not yet been exhausted. The point is that, unfortunately, in a number of rayons soil protective farming methods are not used in an overall manner. In particular, proper attention is not paid to clean fallow everywhere and here and there its areas are reduced periodically and proper care is not provided for it. For example, in Kustanayskaya and Severo-Kazakhstanskaya Oblasts during the Ninth Five-Year Plan, in fact, clean fallow was almost eliminated. As a result, as compared with the Eighth Five-Year Plan, the yield of grain crops was lowered by 2.7 and 1.5 quintals per hectare respectively and, naturally, gross grain output was also reduced (by 811,000 and 165,000 tons). At the same time, Pavlodarskaya, Karagandinskaya, Tselinogradskaya and Kokchetavskaya Oblasts, which took care of clean fallow, despite less favorable soil and climatic conditions increased the yield of grain crops by 1.2 to 1.9 quintals per hectare and gross grain production, by 2,143,000 tons. Owing to

these oblasts it was possible to make up for the shortage of grain that occurred in Kustanayskaya and Severo-Kazakhstanskaya Oblasts more than twofold and the republic coped successfully with the fulfillment of the program of the Ninth Five-Year Plan for the sale of grain to the state. The leadership of Severo-Kazakhstanskaya Oblast took this lesson into consideration and during the 10th Five-Year Plan took measures to restore the lacking fallow areas, which immediately was reflected in grain production. In this indicator the oblast occupied one of the first places in the republic.

The results of research by the scientists of our institute and other scientific institutions, as well as the experience of advanced farms, indicate that the further improvement in crop rotations and their greater saturation with oats and barley can also play an important role in an increase in grain production. In a number of cases these crops produce grain harvests 5 to 8 quintals higher than spring wheat. For example, on the institute's experimental farm during the 10th Five-Year Plan the average yield of barley was 10.2 quintals higher than that of spring wheat, totaling 37.7 quintals per hectare. The Tselinnyy 5 barley variety of the selection of the All-Union Scientific Research Institute of Grain Farming especially proved its value. Under the conditions of a very dry steppe it has no equal in the output of fodder units (up to 40 quintals of fodder units per hectare) and in the content of protein (up to 17 percent), amino acids and lysine.

It seems that the six-field crop rotation with the following crop alternation is most promising for North Kazakhstan: clean fallow-spring wheat-spring wheat-oats-spring wheat-barley. In such a crop rotation 16.7 percent of the area of arable land is annually occupied with clean fallow and 83.3 percent, with grain crops. The proposed crop rotation, along with an increase in the gross output of food grain, makes it possible to more fully meet the needs of animal husbandry for fodder. Furthermore, in this crop rotation it is possible to systematically control weeds and, primarily, wild oats. Weeds are successfully destroyed here both in the fallow field and in oats and barley fields. The end of May and, according to the data of our institute, even the first 5-day period in June are considered the optimum calendar period for the sowing of fodder grain crops under local conditions. By that time the seeds of wild oats and of many other annual weeds germinate fully and their seedlings are easily destroyed during presowing cultivation.

The areas sown with spring wheat after such predecessors usually are clear of weeds. Along with this under our conditions oats is also a phytosanitary crop. Spring wheat sown after it, as well as after fallow, is not affected with root rots.

Minimalization of the cultivation of fallow fields carried out by a partial replacement of mechanical methods of weed control with the application of herbicides, of course, with mandatory deep fall soil loosening (with KPG-250 and KPG-150 deep subsurface cultivators and various types of slotters) also contributes to an increase in grain production. However, to accelerate the popularization of this method, the chemical industry, along with the output of type 2,4-D herbicides, should also increase the production of treflan and triallat. It should produce most of the latter herbicide in granulated form. Its application makes it possible to control wild oats successfully. A mixture of treflan and triallat destroys not only wild oats, but essentially all annual weedy plants as well, including miliary plants. By means of the gialk preparation (produced by the Hungarian People's Republic) used in the dose of 3 liters per hectare it is possible to get rid of wheat grass and in the dose of 6 to 7 liters, of sedge as well.

The application of mineral fertilizers gives good results on the calcareous soil of the republic's northern oblasts. For example, the application of superphosphate (1.5 to 2 quintals per hectare) to grain crops increases their yield by 3.5 to 4 quintals per hectare. The application of nitrogen fertilizers in the dose of 1 to 1.5 quintals per hectare is also effective on poor light-texture soil.

Thus, Kazakhstan has great potentials for an increase in grain production. From their realization during the next decade it can be expected that, on the average, the yield of grain crops will increase to 18 or 20 quintals per hectare throughout the republic and the level of annual grain production will reach 45 to 50 million tons.

In our opinion, kolkhozes and sovkhozes in steppe and forest steppe regions in the country's other areas, where soil protective farming methods adapted to local soil and climatic conditions are successfully applied on an area exceeding 20 million hectares, do not have lesser opportunities.

The All-Union Scientific Research Institute of Grain Farming, being the coordinator of scientific research on soil protective farming, generalized the appropriate vast long-term experimental and production data on the country's main steppe and forest steppe zones. It follows from this generalization that the soil protective farming system, if it is applied creatively with due regard for local natural conditions, provides a significant effect, being a reliable means of control of soil erosion and drought. For example, on the experimental farms of the Siberian Scientific Research Institute of Agriculture the yield of grain crops after the mastering of the soil protective farming system increased to 20 or 21 quintals per hectare and began to exceed the average oblast level almost twice. A high effect from the application of this system is also obtained under the very dry conditions of the Kulunda Steppe in Novosibirskaya Oblast.

Former graduate students at our institute, now candidates of sciences, who have become sovkhоз managers, are engaged in the study and introduction of the soil protective farming system in Orenburgskaya Oblast. For example, in Svetlinskiy Rayon, which is the driest and where chestnut and light-chestnut soil predominates, V. D. Khopryaninov, candidate of agricultural sciences, director of the Sovkhoz imeni 19 Parts'yezda, obtained good results. In the last 6 years the sovkhоз has obtained the highest and most stable grain harvests in the rayon and has systematically overfulfilled the state plans for grain production and sale. In particular, during the 10th Five-Year Plan it sold twice as much grain as planned. Even during the very dry year of 1981 a grain harvest of 18.2 quintals per hectare was obtained. Former graduate student of our institute, Candidate of Agricultural Sciences V. P. Semenov, works as director of the Sovetskiy Sovkhoz in another rayon--Akbulakskiy--in the same oblast under the same conditions (but the soil mostly has a light texture). Previously, on this sovkhоз soil was subjected to the most severe wind erosion and the harvests of grain crops did not exceed 3 to 4 quintals per hectare. After the mastering of the soil protective farming system the harvest of winter rye with a strip placement of crops increased to 12.7 quintals per hectare and in 1981 it was even higher--16.3 quintals per hectare. Furthermore, the output of perennial grass hay increased sharply there. Oblast organizations often held conferences of farmers devoted to problems of soil protective farming on these two sovkhozes.

Soil protective farming methods are successfully introduced into production in the eastern rayons of Rostovskaya Oblast. Field crop rotations with clean fallow have been mastered there, soil is cultivated with subsurface tillers and grain crops are sown with Szs-2,1 stubble seeders. As a result, the yield of cultivated crops has become higher and more stable.

Grain growers in Stavropol'skiy Kray, especially of its eastern rayons, which are the driest, obtained good indicators from the introduction and improvement of soil protective farming methods. In the last few years the yield of grain crops has risen there and the plans for the sale of grain to the state have been fulfilled and overfulfilled more successfully. All this is the result of the persistent work of the workers of the Stavropol' Scientific Research Institute of Agriculture, especially of its division directed by Candidate of Agricultural Sciences Ye. I. Ryabov.

Soil protective farming methods are also successfully mastered on many sovkhozes and kolkhozes in the Ukraine's southern rayons--in Khersonskaya, Zaporozhskaya and Nikolayevskaya Oblasts. The achievements of the Ukrainian Scientific Research Institute of Irrigated Farming should be noted especially. Its investigations have shown that it is advisable to sow afterharvest corn for silage after the harvesting of winter wheat with Szs-9 and Szs-2,1 seeders with point colters on uncultivated soil. As compared with previously practised agrotechnology (plowing, watering, waiting for the soil to dry, harrowing and so forth), about 20 of the warmest summer days are saved and corn yields a double harvest--up to 400 quintals of green mass per hectare. The institute also obtains positive results from the application of soil protective farming methods in the cultivation of other crops with irrigation.

In Zaporozhskaya Oblast the practice of introduction of the soil protective farming system on the Avrora Kolkhoz in Primorskiy Rayon, where wind erosion hardly stopped during previous years, is very significant. After P. O. Timofeyev, chairman of this kolkhoz, had visited our institute in 1966, the farm began to master the soil protective farming system. Wind soil erosion stopped immediately and the harvests of grain crops increased. For example, on the average, the harvest of winter wheat increased to 40 or 45 quintals per hectare. Even in 1981, when not a single rain fell during the entire vegetative period, on the average, the kolkhoz obtained 36 quintals of grain per hectare.

Soil protective farming methods have become most widespread in Nikolayevskaya Oblast. On most sovkhozes and kolkhozes soil under winter wheat and other grain crops is now cultivated only with antierosion implements and grain crops are sown with stubble seeders.

Extremely useful work on an improvement in soil protective technologies of cultivation of grain crops and on their study under the production conditions of a number of rayons and on their introduction on the oblast's kolkhozes and sovkhozes is carried out under the guidance of Candidate of Agricultural Sciences I. Ye. Shcherbak, who is an outstanding scientific innovator. On the Novo-Odesskiy State Strain Testing Plot, according to topics coordinated with us, as of 1969 he has conducted comparative tests of the ordinary technology of cultivation of grain crops based on annual soil plowing with soil protective technology. The results of these investigations (table) point to the exceptional effectiveness of soil protective technology. Even winter barley, which is usually cultivated in Moldavia and Krasnodarskiy Kray under warm climatic conditions, on the Novo-Odesskiy State Strain Testing Plot yields a grain harvest in its amount close to winter wheat sown after clean fallow.

Yield of Grain, Pulse and Hulled Crops With Different Technology of Their Cultivation on the Novo-Odesskiy State Strain Testing Plot  
(quintals per hectare)

Crop	Years of investigations	With ordinary technology	With soil protective technology
Winter wheat			
after clean fallow	1971-1981	56.0	61.1
after peas	1971-1981	41.5	48.4
after corn for silage	1971-1981	37.1	45.1
Winter barley after corn for silage	1977-1981	33.1	52.2
Spring barley	1969-1981	38.4	43.2
Peas	1961-1981	20.8	27.0
Millet	1971-1981	33.3	41.2

In the last few years very extensive work on an improvement in the farming system has been carried out in Poltavskaya Oblast. F. T. Morgun, first secretary of the oblast committee of the Communist Party of the Ukraine, active participant in the development of virgin land in Kazakhstan, is its initiator and organizer. In July 1981 the workers of the USSR Ministry of Agriculture and of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin held a coordinating conference on soil protective farming and the protection of soil against erosion in Poltava. The need for holding it was dictated by the exceptionally severe drought that has afflicted this oblast that year: From May until the ripening of grain crops there was only 16 mm of precipitation with an average norm of 66 mm. The soil protective farming system, whose methods have been applied on 946,000 hectares in the oblast, helped to avoid its destructive effect. Crops placed after soil protective cultivation not only did not perish, but produced a good harvest. For example, on the areas sown with winter wheat on the oblast's support farms (area of 153,000 hectares), on the average, 34.3 quintals of grain per hectare were gathered and on the Rad'yanska Konstitutsiya Kolkhoz in Novo-Sanzharskiy Rayon and on the Kolkhoz imeni Shevchenko in Mirgorodskiy Rayon (area of 1,640 hectares), 37.8 quintals per hectare. On the Taktaulovo and Yubileynyy educational farms of the Poltava Agricultural Institute 38.9 and 44.8 quintals of winter wheat grain per hectare were obtained respectively on an area of 585 and 639 hectares. The yield of other grain crops was also high. For example, on the Yubileynyy Educational Farm on areas sown with winter rye 35 quintals of grain, 28.2 quintals of spring barley, 26 quintals of oats and 22 quintals of peas per hectare were gathered.

The data presented point to the great success of the "Poltava Experiment" in overcoming the destructive effect of the 1981 drought and indicate that for the country's steppe and forest steppe regions the soil protective farming system is a reliable means of increasing the yield and production of grain during very dry years.

It seems that the fulfillment of the food program outlined at the 26th CPSU Congress will largely depend on the speed and mass nature of introduction of this system into the daily practice of farms in the country's main grain producing steppe and forest steppe regions.

In order to speed up this process, it is necessary to see to it that the production of the necessary antierosion equipment is increased not only in Kazakhstan, but in the Ukraine and the Russian Federation as well, of course, with due regard for the characteristics of their soil and climatic conditions and cultivated crops. The need for the development of equipment adapted to local conditions is due to the fact that water soil erosion also presents a great danger in many dry regions. To control this destructive process, it is also necessary to introduce into production the system of slope farming developed at the Altay Scientific Research Institute of Selection and Farming under the guidance of A. N. Kashtanov, academician of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin, which has proved its value.

With regard to the development of new equipment, when it is designed, along with engineers, scientists of different specializations (agronomists, soil scientists and economists) should participate in this work, as was the case on virgin land in Kazakhstan.

It seems that the Ministry of Agricultural Machine Building, the State Committee for Supply of Production Equipment for Agriculture, the Ministry of Chemical Industry and the All-Union Scientific Production Association for Agrochemical Services to Agriculture will take the appropriate measures and ensure the output of the necessary amount of antierosion equipment, fertilizers, herbicides and agents for the control of plant pests and diseases so that soil protective farming may become even more effective everywhere.

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## TILLING AND CROPPING TECHNOLOGY

### USE OF ZONAL FARMING SYSTEMS FOR DROUGHT CONTROL ADVOCATED

Moscow ZEMLEDELIYE in Russian No 3, Mar 82 pp 2-5

/Article by Yu. A. Nikitin, deputy chief of the Main Administration for Grain Crops and General Problems of Farming of the USSR Ministry of Agriculture: "On the Basis of Zonal Farming Systems"/

/Text/ Spring will come soon, very soon and with its arrival a mass sowing of spring crops and work on the care of winter crops and perennial grass will expand in the country. We cannot yet know whether the weather will be favorable to farmers or not. Therefore, as Comrade L. I. Brezhnev noted at the November (1981) Plenum of the CPSU Central Committee, "... work in agriculture must be more skillfully adapted to climatic adversities." This principle of work of farmers in Omskaya Oblast has already been discussed in our journal (No 2) in the article by N. Z. Milashchenko and L. G. Karchevskiy. The editorial board again calls the readers' attention to urgent, new data on this subject.

Out of the elemental phenomena of nature droughts do the greatest damage to our country's agriculture. Most often they occur in the Volga Area, Siberia, North Kazakhstan, steppe regions of the Ukraine and North Caucasus, the central chernozem zone and the Southern Urals. A severe drought occurred in 1981. During 3 months of the vegetative period it afflicted the Volga Area and the Volgo-Vyatskiy, Tsentral'no-Chernozemnyy and Severo-Kavkazskiy Regions. The drought was manifested to a somewhat lesser degree in the Urals, North Kazakhstan, West Siberia and southern and eastern regions of the nonchernozem zone of the RSFSR. The yield of agricultural crops and their gross output in these regions were lowered considerably.

At the same time, scientific research data and the practical experience of advanced farms show that it is possible to greatly lessen the damage from droughts and thereby to lend a greater stability to the development of agriculture. The solution of this problem is of extremely great importance for the country's reliable provision with food.

A constant orientation of organizational and agronomical work in dry regions toward the possibility of manifestation of a severe drought in any year is the main condition for successful drought control. The synoptic service does not yet have the capabilities to give long-term weather forecasts with a sufficient reliability, especially for specific limited territories. Therefore, it is necessary to be always ready to overcome weather adversities.

Scientific research institutions and local agricultural bodies analyzed the effectiveness under dry conditions of various measures and methods in experiments and production in 1981 and during other years, which should help farmers in the development of a more effective strategy and tactics of the fight for the harvest.

Let us dwell on the most important provisions and conclusions resulting from a generalization of the indicated data on the country's main agricultural zones.

#### The Ukraine and Moldavia

Agricultural science and the practice of steppe farming in these republics have accumulated extensive experience in overcoming the negative consequences of droughts on the basis of the introduction of zonal farming systems. The example of improvement in the management of farming and increase in its effectiveness in Dnepropetrovskaya Oblast is characteristic in this respect.

In that oblast before the introduction of a scientifically substantiated farming system during dry years (1963, 1968, 1972 and 1975) the yield of the leading grain crop--winter wheat--did not exceed 18 quintals per hectare. After the introduction of the farming system its productivity increased even during the very dry year of 1981 and, on the average, the harvest of winter wheat grain obtained on three experimental farms of the All-Union Scientific Research Institute of Corn was about 40 quintals per hectare, of corn, 35 quintals per hectare and of barley, 30 quintals per hectare.

The practical experience of grain growers on the Ukraina Kolkhoz in Genicheskiy Rayon, Khersonskaya Oblast, located on dark chestnut solonets soil in the driest part of South Ukraine is also significant. In 1981 almost 40 quintals of winter wheat grain and 27 quintals of barley per hectare were gathered there. The zonal farming system was also fully mastered on this farm.

The introduction of a rational structure of sown areas, of correct crop rotations, of a system of antierosion measures and, in particular, soil protective technology of soil cultivation, of a rational use of fertilizers and plant protection agents, of drought resistant varieties and hybrids and of advanced differentiated technologies of crop cultivation depending on existing weather conditions, which were envisaged by the zonal farming system, was of decisive importance in drought control on advanced farms in South Ukraine.

It can be concluded that in the steppe regions of the Ukraine the structure of sown areas should be especially dynamic. For example, during years when the second half of the summer and fall are wet it is advisable to increase the areas sown with winter crops and during years when this period is dry their area should be limited to the availability of good predecessors guaranteeing a reliable appearance of seedlings. For example, in Donetskaya Oblast in 1981 (according to the data of the oblast agricultural administration) the average harvest of winter wheat after black fallow was 33.9 quintals per hectare and after stubble predecessors, 8.7 and after row predecessors, 7.9 quintals per hectare less.

In Primorskiy Rayon, Zaporozhskaya Oblast, where clean fallow occupied 15 percent of the arable land, the average harvest of grain crops obtained last year was 30 quintals per hectare, whereas throughout the oblast it was lower, the proportion of the fallow area comprising 6 percent. There are similar data for Krymskaya Oblast.

Maneuvering soil cultivation methods is a reliable means of drought control. According to the data of the Ukrainian Scientific Research Institute of Farming, in Poles'ye of the Ukraine in 1981 winter wheat after lupin for green fodder yielded the highest harvest (34.2 quintals per hectare) with shallow disk soil cultivation. Subsurface cultivation was also effective. In the northern forest steppe of the Ukraine during dry years the highest harvest of winter wheat placed after peas was obtained with shallow share and disk soil cultivation.

According to the data of the All-Union Scientific Research Institute of Corn, in the steppe zone of the Ukraine during dry years shallow soil cultivation with subsurface tillers or disk implements is more effective than plowing. This is also confirmed by production experience.

There are similar data in the Moldavian SSR. For example, according to the data of the Moldavian Scientific Research Institute of Field Crops, in 1981 the use of the combined AKP-2,5 unit or implements with subsurface working elements increased the harvest of winter wheat grain by 4 quintals per hectare as compared with plowing.

The application of fertilizers greatly helps to diminish the damage from drought. In the steppe regions of the Ukraine during dry years the application of fertilizers reduces the consumption of productive moisture for the formation of 1 quintal of winter wheat by 41 percent and of spring barley, by 25 percent.

Taking into consideration that at present there is still a shortage of mineral fertilizers, it is most advisable to apply them to rows during sowing.

It is very important to ensure the proper selection of varieties with due regard for their drought resistance and other qualities. For example, the Donetskaya 5 and Akhtyrchanka winter wheat varieties suffered less from drought in Donetskaya Oblast in 1981, Akhtyrchanka and Il'ichevka, in Sumskaya Oblast, Akhtyrchanka and Odesskaya 51, in Cherkasskaya Oblast and Polukarlikovaya 49, in Zaporozhskaya Oblast.

It is necessary to speed up the strain change. Unfortunately, in the steppe of the Ukraine 30 percent of the areas sown with winter wheat are still occupied with the Bezostaya 1 variety, although the new varieties are much more productive.

It should be taken into consideration that an effective use of moisture is ensured with a strict observance of the optimum sowing time and rates of seeding of agricultural crops. In the experiments of the All-Union Scientific Research Institute of Corn, when winter wheat was sown on 7 to 9 September (the optimum time), the harvest was 49.6 quintals per hectare, on 25 August, 33.5 quintals per hectare and on 25 September, 30.7 quintals per hectare. There are similar data for Moldavia, where the last 10-day period in September is the optimum sowing time.

According to the data of the Donetskaya Oblast Agricultural Experimental Station, the biggest harvest of the Donetskiy 8 barley variety was obtained in 1981 at the seeding rate of 4 million seeds per hectare.

The experience of Magdalinovskiy Rayon in Dnepropetrovskaya Oblast is instructive. In 1981 a total of 16.8 quintals of pea grain per hectare were obtained there, whereas only 7.9 quintals per hectare, throughout the oblast. Success was ensured mainly by the early time of pea sowing on a fall plowed area, by the use of early ripening varieties, by a prompt organization of pest, disease and weed control and by a correct application of fertilizers.

Last year many farms in the Ukraine and Moldavia obtained rich harvests of corn grain. This was possible owing to the placement of its sowings after the best predecessors, prompt fall plowing, replacement of spring harrowing and first cultivation with the leveling of fields with leveling drags and use of calculated doses of fertilizers for the planned harvests, as well as of highly effective soil herbicides making it possible to sharply reduce the number of interrow cultivations and to retain moisture.

Damage from drought is reduced considerably when the standard of farming is high. In 1981 farms in Zhashkovskiy Rayon, Cherkasskaya Oblast, where a high standard of farming was attained, gathered 29.4 quintals of grain crops per hectare and in Monastyryshchenskiy Rayon, which has approximately the same natural conditions, only 23.6 quintals.

#### North Caucasus

The modern zonal farming systems of this region have a pronounced direction toward overcoming frequent droughts and soil erosions. The recommended measures are carefully differentiated according to soil and climatic zones. Advanced technologies of cultivation of agricultural crops are the most important components of these farming systems. On the farms that mastered them damage from the drought in 1981 was minimal. For example, the yield of winter wheat in Ust'-Labinskij Rayon, Krasnodarskiy Kray, was 42 quintals per hectare, in Dinskiy and Temryukskiy Rayons, 40 and 41 quintals per hectare and, on the average, in the kray, 32.4 quintals per hectare.

On the Gigant Sovkhoz in Rostovskaya Oblast in 1979, which was a dry year, 32.5 quintals of grain per hectare were gathered and throughout the oblast, only 10.6 quintals per hectare; in 1981, a total of 34 and 16.8 quintals per hectare respectively. The favorable composition of the predecessors of winter crops with a high proportion of fallow is of especially great importance for the production of big harvests of grain crops on the Gigant Sovkhoz during dry years.

In the experiments of the Donskiy Zonal Scientific Research Institute of Agriculture in 1979 there was no loss of winter crops after clean fallow and the grain harvest was 50 quintals per hectare, but after nonfallow predecessors a considerable loss of plants was observed and the harvest was low (25 to 30 quintals per hectare).

Experience shows that the negative consequences of droughts can be reduced through the use of surface soil cultivation under winter crops after corn and of other late-harvested predecessors. This contributes to a better retention and accumulation of moisture in soil and to the appearance of good seedlings of winter crops. However, subsurface, disk and other shallow cultivations after grain predecessors under winter crops do not produce an effect, because an intensified development of root rots occurs.

A correct selection of varieties is very important in this zone. For example, in Krasnodarskiy Kray under dry conditions Krasnodarskaya 39, Partizanka and Krasnodarskaya 57 winter wheat varieties have an advantage.

The investigations conducted in the zone have confirmed that the application of fertilizers greatly lowers the transpiration coefficient and makes it possible to more productively utilize the reserves of winter and early spring moisture. According to the data of the Stavropol' Scientific Research Institute of Agriculture, the consumption of water for the formation of 1 quintal of winter wheat grain without fertilizers totaled 120 to 150 tons and, when fertilizers were applied, 70 to 100 tons. Furthermore, ripening occurred 3 to 5 days earlier. According to the data of 12-year experiments of this institute, during very dry years the output of winter wheat grain without fertilizers was lowered by a factor of 6.2 and, when they were applied, only to one-half.

The results of work of rice growers in the Kuban' in 1981 are interesting. The yield of rice on the Krasnoarmeyskiy Rice Sovkhoz totaled about 50 quintals per hectare, on the Krasnoye Elite Seed Farm, 52 quintals per hectare and on the Kolkhoz imeni Michurin, 46.5 quintals per hectare. The rich harvests obtained on these farms are the results of a strict observance of technological discipline and of the introduction of new rice varieties (Start and Spal'chik).

#### Nonchernozem Zone

As already noted, the 1981 drought afflicted not only dry steppe regions, but the country's nonchernozem zone as well. Many advanced farms were able to minimize the damage from drought there. For example, the Rossiya Kolkhoz in Pochinkovskiy Rayon, Smolenskaya Oblast, gathered an average of 22.6 quintals of grain per hectare, the Sovetskaya Armiya Kolkhoz in Roslavl'skiy Rayon in the same oblast, 21.3 quintals per hectare, the Kolkhoz imeni Michurin in Balezinskiy Rayon in the Udmurtskaya ASSR, 17.7 quintals per hectare, the Krasnaya Zarya Kolkhoz in Bol'shesel'skiy Rayon, Yaroslavskaya Oblast, 28.1 quintals per hectare and the Pobeda Kolkhoz in Pskovskiy Rayon, Pskovskaya Oblast, 28.5 quintals per hectare.

The experience of advanced farms has confirmed that under the dry conditions of this zone the importance of winter crops, especially those placed after good predecessors, increases.

The replacement of plowing with surface soil cultivation under spring and winter crops also proved effective in reducing the negative consequences of the drought in 1981. Moldboard scuffling under winter crops produced especially good results.

The positive effect of subsoiling on an improvement in the water regime of soil was again confirmed in the nonchernozem zone last year. Subsoiling by plowing with plows with subsoilers and cut-out bodies is most effective in combination with the application of fertilizers and lime.

The experience of the Kolkhoz imeni Lenin in Orshanskiy Rayon, Vitebskaya Oblast, is instructive. In 1981 it obtained 32.3 quintals of grain per hectare, while the average harvest during the 10th Five-Year Plan was 29.5 quintals per hectare. On this farm crop rotation fields were enlarged, amelioration work was carried out and a great deal was done to increase soil fertility. On the average, every hectare of arable land annually receives 14 to 15 tons of organic fertilizers. On the kolkhoz the proportion of areas sown with winter rye is high and much attention is paid to the introduction of new varieties.

#### Volga Area

In this dry zone modern farming systems are of a pronounced soil protective and moisture accumulating nature. They are based on crop rotations with a high proportion of clean fallow and a soil protective complex.

The experience of 1981 convincingly confirmed the high effectiveness of grain-fallow-low-row crop rotations in the zone. According to generalized research data, clean fallow, as compared with nonfallow predecessors, ensures a double and even greater increase in the yield of winter and spring grain crops.

Calculations show that throughout the zone it is necessary to have 3.3 million hectares of clean fallow (10.9 percent of the area of arable land) as compared with the 2.4 million hectares actually available in 1981.

The soil protective cultivation system especially proved its value in 1981, which was a dry year. With its application the Kuybyshev Scientific Research Institute of Agriculture obtained 26.7 to 27.9 quintals of grain per hectare.

According to the data of the administration of agriculture of the Volgogradskaya Oblast Executive Committee, during dry years subsurface cultivation increases the grain harvest by 2 to 3 quintals per hectare. It is characteristic that in 1981 the lowest harvests of grain crops were obtained in the Volga Area where soil was not prepared in fall.

Windbreak strips from long-stem plants, which contribute to a better snow accumulation on fields, proved to be very effective in the Trans-Volga Area. Owing to windbreaks, on the clean fallow of the Saratov Trans-Volga Area the yield of spring grain crops increases by 1.5 to 3 quintals per hectare.

And again it is necessary to talk about the great importance of varieties. For example, in Pugachevskiy Rayon, Saratovskaya Oblast, in 1981 the introduction of the Saratovskaya 46 drought resistance spring wheat variety made it possible to increase the grain harvest by 2.8 quintals per hectare as compared with Saratovskaya 38. The Krasnokutka 6 durum wheat yielded an even greater increase (3.6 quintals per hectare) as compared with Khar'kovskaya 46. Of course, the observance of the recommended seeding rates and sowing time, careful leveling of the field surface and postsowing packing also play a vast role in drought control in this zone.

The investigations of the Scientific Research Institute of Agriculture of the South East show that the first 5-day period after the beginning of field work is the optimum time for the sowing of spring wheat in the zone. A delay of 5 days in sowing leads to a loss of 0.9 quintals of grain per hectare and of 10 days, 1.9 quintals per hectare.

#### Urals, West Siberia and North Kazakhstan

The indicated regions are the driest in the country. At the same time, the experience of advanced farms indicates that even here, when zonal farming systems are mastered, it is possible to sharply lower the damage from drought. For example, the Novoural'skoye Experimental Model Farm of the Siberian Scientific Research Institute of Agriculture (Omskaya Oblast) obtained a harvest of 17.7 quintals of grain crops per hectare on an area of 20,000 hectares.

The Konstantinovskiy Sovkhoz in Kokchetavskaya Oblast, the Sovkhoz imeni KazTsika in Tselinogradskaya Oblast, the Zarya Kolkhoz in Dalmatovskiy Rayon, Kurganskaya Oblast, and others annually obtain high harvests of grain crops.

All of them have successfully mastered zonal farming systems based on grain-fallow crop rotations with a brief rotation and soil protective cultivation. According to long-term data, in the South Urals, North Kazakhstan and West Siberia four- and five-field grain-fallow crop rotations ensure the biggest output of grain per hectare of a crop rotation area.

The introduction of crop rotations with clean fallow created the possibility of effectively utilizing new varieties of grain crops and fertilizers and of applying soil protective technology. For example, it is noteworthy that on the Novoural'skoye Experimental Model Farm of the Siberian Scientific Research Institute of Agriculture the proportion of clean fallow comprises 18 percent of the arable land, only new intensive varieties are cultivated on the entire area, the entire arable land is cultivated with subsurface implements, mineral fertilizers are applied to grain crops mainly locally and windbreak strips are established on the entire fallow area.

The practical experience of the Zarya Altaya Kolkhoz in Zav'yalovskiy Rayon, Altayskiy Kray, is also significant. Before the introduction of the soil protective complex the yield of grain crops was 9.4 quintals per hectare there. When it was fully mastered during the 10th Five-Year Plan, it reached 18.2 quintals per hectare and in 1981, which was a dry year, 14.8 quintals per hectare.

In 1981 the Voskhod Kolkhoz in Zmeinogorskiy Rayon, Altayskiy Kray, obtained a harvest of 25.7 quintals of grain per hectare and the Kolkhoz imeni I. Ya. Shumakov in the same rayon, 21.4 quintals per hectare. On these farms scientifically substantiated crop rotations have also been mastered, the structure of sown areas has been improved, the clean fallow area has been increased to the optimum size and field work is performed in a high-quality manner and at the best time. On the entire area of grain crops highly productive, new varieties are cultivated and seeds of high reproductions of the first and second categories of the sowing standards are sown.

According to the data of the All-Union Scientific Research Institute of Grain Farming under the conditions of the prolonged July-August drought the advantage of the Tselinnaya 21 medium-late spring wheat variety sown on a relatively early date--15 May--was manifested most distinctly. The grain harvest of the Saratovskaya 29 and other varieties of Saratov selection sown on 15 to 25 May was approximately the same. A later sowing date (30 May) produced a lowered harvest everywhere.

The results of experiments with the rates of seeding of spring wheat showed that the rates of 2.5 to 3 million seeds per hectare were the most effective.

Under the conditions of 1981 an overall (without a time gap) performance of pre-sowing cultivation and sowing on the same field, as well as a deep (6 to 8 cm) placement of seeds in the wet soil layer, ensured a significant reduction in the negative consequences of the drought.

Thus, the experience of farmers in the South Urals, North Kazakhstan and West Siberia shows that the introduction of all the units of the soil protective farming system (grain fallow crop rotations, subsurface cultivation, implementation of moisture accumulating measures, application of herbicides and of phosphoric fertilizers and sowing of drought resistant varieties) is a reliable means of drought control.

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